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INTESTINAL OBSTRUCTION IN INFANTS: A CHALLENGE.¹

By A. MURRAY CLARKE, F.R.C.S., D.C.H.,
Melbourne.

A STUDY of intestinal obstruction in infants presents a challenge from several points of view to all who are interested in children's diseases: firstly, the challenge of loss of lives of children, which Australia can so ill afford from an economic standpoint; secondly, the situation which we must face that in the sphere of abdominal surgery we have not kept pace with other countries; thirdly, the well-known fact that the mortality from intestinal obstruction reaches its highest peaks in early life and in old age. How may this state of affairs be altered?

As I hope will be clearly brought out later in this paper, the principal factors in lowering mortality will be: (i) a clear knowledge by the surgeon of what he may expect to find, and improved surgical technique; (ii) earlier diagnosis and consequently earlier treatment; (iii) adequate supportive treatment both before and after operation.

The last two factors are by far the most important. Sherrin's words should be written large in every children's hospital operating theatre: "Anyone who opens the abdomen should be capable of dealing with any condition he may find there." Until recently this was well illustrated in the 100% mortality from *volvulus neonatorum* and duodenal stenosis due to a failure to appreciate the underlying pathological state and to realize that the obstruction primarily affected the duodenum, not the jejunum and ileum, and could be relieved by the simplest of surgical techniques.

A survey of 836 cases of intestinal obstruction in children under three years of age in two five-year periods (1932-1937 and 1943-1948) revealed some significant facts; this included all the patients with acute appendicitis (87) in the same period and in the same age group, amongst whom all deaths (13) were obviously associated with intestinal obstruction of a paralytic type (Table I).

TABLE I.
Cases of Intestinal Obstruction in Children under the Age of Three Years at the Children's Hospital, Melbourne, during the Years 1932-1937 and 1943-48.

Diagnosis.	Period.	Cases.	Deaths.	Mortality Percentage.	Mortality Average Percentage.
Pyloric stenosis ..	1932-37	138	28	20.3	
	1943-48	196	5	2.5	10
Intussusception ..	1932-37	129	16	12.4	
	1943-48	183	13	7.1	9
Intrinsic congenital obstruction.	1932-37	8	8	100.0	
	1943-48	8	7	87.5	
Extrinsic congenital obstruction.	1932-37	5	5	100.0	
	1943-48	9	5	55.0	
Oclusion of large bowel and anus.	1932-37	14	9	64.0	
	1943-48	31	15	48.0	
Obstruction from other causes.	1932-37	14	8	57.0	
	1943-48	14	6	43.0	
Acute appendicitis	1932-37	22	6	27.3	
	1943-48	65	7	10.8	15

There has been a general lowering of mortality, but this is greatest in relation to pyloric stenosis and least in the group of congenital occlusions of the bowel. The reason for this is not far to seek and in it we find the clue to the reduction in the overall mortality of intestinal obstruction in infants.

Owing to the work of Dr. Howard Williams in 1938 it is now realized that subjects of pyloric stenosis are infants

¹ Read at a combined meeting of the Section of Paediatrics and the Section of Surgery, Australasian Medical Congress (British Medical Association), Sixth Session, Perth, August, 1948.

of poor nutrition suffering from a high intestinal obstruction who require not only relief from the obstruction but also correction of alkalosis, chloride deficiency and dehydration. In a consideration of intestinal obstruction in the very young, one realizes the significance of Moynihan's cryptic remark: "Surgery has been made safe for the patient, now we must make the patient safe for surgery."

The death of 22 out of 45 patients with an imperforate anus or rectal atresia after an operation of only moderate severity emphasizes this statement. In some cases certainly the obstruction had produced ballooning and necrosis of the terminal portion of gut, but the majority of the patients had inadequate preparation for operation and some had been suffering from intestinal obstruction for some days before treatment.

Preparation for Operation.

Replacement Therapy.

The infant's blood volume varies according to the size of the patient (the height being the most constant factor) and varies from 200 to 750 millilitres from birth to three years of age. It is apparent, therefore, that we are dealing with small amounts of fluid and that there is little margin of error in overdosage and underdosage.

Both experimentally and clinically brilliant research work in recent years has disclosed the significance of fluid and electrolyte loss, particularly in high obstruction.

When fluid is lost by vomiting the blood plasma is first drawn on for replacement, as is shown by laboratory tests—haemocrit determination and haemoglobin estimation. Replenishment is in turn made from the intercellular fluid, and this is shown by clinical changes of dehydration. In more moderate degrees of dehydration, although the skin and lips are dry, the mucous membrane of the mouth is still moist and also the skin of the palms and soles. When the dehydration becomes severe the skin is ashen and dry and mottled if peripheral circulatory failure has developed, the eyes are sunken, the mucous membrane of the mouth and the skin of the palms and soles are dry, and apathy replaces the irritability of moderate dehydration. In severe dehydration an infant can lose 20% of body weight. This rapid dehydration is most apparent in duodenal stenosis of the newborn. Within thirty-six hours a normal-looking newborn baby will change into a wizened creature with sunken fontanelle and inelastic skin hanging in folds on its body.

After a decision has been made as to the degree of dehydration present, for which as yet no adequate rapid laboratory investigations are available, the amount of fluid required to replace loss and maintain the future level must be estimated.

Fluid requirements are two and a half ounces per pound of body weight in twenty-four hours or 150 millilitres per kilogram of body weight in twenty-four hours.

To replace additional dehydration a severely dehydrated infant (20% fluid loss) requires 125 millilitres per kilogram, and a moderately dehydrated infant (10% fluid loss) requires 50 to 75 millilitres per kilogram. This may be given at first at 10 to 15 millilitres per minute and then slowed down to three to six millilitres per minute.

The normal water intake of an infant is five times greater than that of an adult in proportion to their weights, and the relative urinary output is also much greater because of a higher metabolic rate, a greater excretion of waste products and also a much poorer concentrating power of the kidneys. The last factor makes it easy to give more sodium chloride than can be eliminated by the infant kidney, with resultant salt retention, oedema and an oliguria which may be wrongly interpreted as a demand for the intravenous administration of more saline solution. An infant requires only one gramme of sodium chloride daily, or in other words only 125 millilitres of normal saline solution per day.

To meet the caloric requirements it is theoretically necessary for all fluids given to contain 10% of dextrose, but for prolonged administration more than 5% of dextrose will cause thrombophlebitis.

Protein requirements have up to the present been met by repeated small blood and plasma transfusions. In time surely the use of amino acids intravenously will be developed.

Vitamin C and vitamin K should be added to promote wound healing and haemostasis.

In most cases of intestinal obstruction a small transfusion of blood is desirable, particularly prior to and during an operation, as dehydration makes the patients more susceptible to shock. It has been shown that the loss of blood during all operations is greater than is generally thought, and in a small baby with a blood volume of about 250 millilitres every fraction of blood lost is important. Where there is some degree of inanition blood or plasma will correct the hypoproteinæmia.

In the presence of a strangulated obstruction such as intussusception, blood is the fluid of choice, and its administration is advisable in all cases in which the pulse is hurried and the blood pressure indicates shock. In intussusception one is faced with the dilemma of prolonging the time for important resuscitation at the expense of further devitalization of gut, but it is only in this way that necessary resections, recovery from which is a great exception, will be made possible.

Gastric Suction.

Gastric suction by means of the Wangensteen duodenal tube and the Miller-Abbott tube is said to be the greatest single technical contribution to abdominal surgery in the past fifteen years in reducing mortality in adult intestinal obstruction.

Because of its size the Miller-Abbott tube has no place in intestinal obstruction of infants, but gastric suction by means of a large catheter or a small stomach tube should be more frequently used in order, firstly, to prevent pneumonia from inhalation of vomitus, which is so often a cause of death in these babies and which unfortunately has frequently commenced before the surgeon is asked to see the child, and, secondly, to reduce the distension in the high intestinal obstruction which goes on to ischaemia necrosis and perforation of the terminal segment.

Similarly deflation of the stomach immediately before operation will prevent the regurgitation of vomitus into the bronchial tree during operation and will also make the intestinal manipulations easier.

Like the replacement therapy, the gastric suction should also continue post-operatively until the bowel resumes normality. A chart of fluid intake and output is essential in management.

Oxygen Therapy.

Inhalations of high concentrations of oxygen may be used to reduce abdominal distension.

Chemotherapy.

Sulphonamides are of use in adequate doses. Penicillin is given intramuscularly in large doses, and 100,000 units left in the peritoneal cavity at operation will materially assist in the prevention of secondary complications, such as bronchopneumonia, and will combat peritoneal infection. Streptomycin has been used with quite apparent benefit in some cases of general peritonitis when the patient was very ill and will be used more frequently when greater supplies are available.

Avoidance of Trauma.

The avoidance of unnecessary trauma before and after operation is important.

The giving of enemas, a time-honoured custom, appears to be of very little value in either diagnosis or therapy.

Rectal examinations, which are of such value in diagnosis, are considerably shocking and should not be repeated. In some of the cases reviewed the patients had been examined rectally by five different medical men before reaching the operating theatre. In the case of intussusception with a good history and a palpable tumour there is no justification for any rectal examination at all.

Body heat will be conserved and further shock avoided if skin preparation for operation is carried out in the operating theatre.

Points in Early Diagnosis.

Early diagnosis is one of the most important factors in reducing the mortality, as late diagnosis results in operation upon patients who have already developed bronchopneumonia from inhaled vomitus or whose gut is no longer viable.

In a discussion on diagnosis it is useful to divide the intestinal obstructions into the following groups: (i) congenital abnormalities involving (a) small intestine and (b) large bowel and anus; (ii) meconium ileus and obstruction from neuro-muscular incoordination; (iii) simple obstruction from bands formed after appendicitis and after intussusception; (iv) intussusception; (v) pyloric stenosis.

Occlusions of the Small Intestine.

It is common to divide congenital occlusions of the small intestine into atresias and stenosis, and the latter again into stenosis of an external or internal type, the external type being due to occluding bands compressing from outside the lumen of the gut. There appears to be no good reason for this differentiation and it would be better to discard the terms atresia and stenosis in favour of complete or incomplete, intrinsic or extrinsic types of congenital occlusion. The pathological basis of the intrinsic type is a failure of part of the small intestine to become canalized during the fifth to the tenth weeks of intrauterine life; this may show itself in (i) multiple defects of continuity (said to occur in 15%), (ii) a ballooned blind sac, (iii) an internal dividing septum of varying thickness, or (iv) a narrowing of varying size, the lumen being sometimes so fine that it will not admit a probe.

The completeness of the obstruction can be determined by (a) X-ray examination, which reveals an absence of air in the intestines distal to the block, and (b) Farber's test—the meconium showing an absence of epithelial cells from swallowed amniotic fluid.

An analysis of the group of small bowel obstructions at the Children's Hospital for the past five years reveals eight cases of intrinsic obstruction, only one of which was not complete, and nine cases of extrinsic obstruction, one of which was a volvulus alone, and in three others of which a volvulus was also present in addition to a duodenal occlusion.

Patients with intrinsic obstructions had early frequent copious persistent vomiting; this was sometimes projectile and the vomitus often contained bile. Stools either were not present or consisted of dry meconium, except in the case of the partial obstruction of the ileum, in which, although the orifice was extremely minute, the passage of relatively large stools obscured the diagnosis for a long time. Abdominal distension was present in all except one case, being greater in the lower obstructions; it was observed to be localized to the upper part of the abdomen in two cases in which the duodenum terminated in a blind sac.

Peristaltic waves were seen in the older babies and a ladder pattern was present in the obstruction, which was at first incomplete. Great loss of weight (about 16 ounces in three or four days) was present. The average age of admission to hospital was three days, and the average length of survival was nine days, except for that one patient who is alive and well today after a side-to-side anastomosis of the ileum.

The extrinsic obstruction is due to compression by bands related to non-rotation of the large bowel when it returns to the peritoneal cavity between the tenth and twelfth weeks of intrauterine life and faulty fixation of the mesentery of the small and large bowel which takes place soon afterwards. The short attachment of the mesentery supporting the intestine from the duodeno-jejunal junction to the transverse colon provides an axis around which this portion of the gut forms a volvulus. Although the mechanism of these abnormalities and the significance of the duodeno-colic isthmus were lucidly described by Dott, of Edinburgh, in 1923, and although George Waugh, of the

Hospital for Sick Children, Great Ormond Street, emphasized that these malformations were a clinical entity in 1928, little use of this knowledge has been made until recently. A high mortality attended a simple reduction of the volvulus until it was realized that frequently a duodenal obstruction coexisted which it was possible to relieve by simply dividing bands stretching across the duodenum from the right postero-lateral abdominal wall to the misplaced caecum; this allowed the caecum to take up a position on the left of the superior mesenteric artery and thus widened the duodeno-colic isthmus and prevented recurrence of volvulus.

Of the nine patients with extrinsic obstruction each had a similar history characterized in all cases by persistent vomiting of bile-stained material, projectile in more than half the cases, small constipated motions, moderate abdominal distension confined to the upper part of the abdomen and great dehydration and loss of weight. Although the average age on admission to hospital was four days they were not operated on until an average age of seven days, but there are four survivors.

These obstructions must be differentiated from pyloric stenosis, meconium ileus and neuro-muscular incoordination of gut.

Pyloric stenosis may be distinguished by the later onset of symptoms, the absence of bile in the vomitus, the presence of a palpable tumour and visible peristalsis, predominance in males and characteristic radiological findings.

Meconium ileus may be identified by the radiological findings of minute bubbles of gas forced into a solid mass as described by Neuhauser.

A confirmatory laparotomy should be performed and lavage of the meconium through an ileostomy commenced; pancreatin and a diet of high caloric value with a high protein and carbohydrate content should be given orally.

Neuro-muscular incoordination of gut is so rare that only one case has been classified as such in five years in the Children's Hospital records. Laparotomy should be carried out to exclude a mechanical obstruction and a low ileostomy or colostomy performed.

Occlusion of the Large Bowel and Anus.

When the results of treatment of the relatively common occlusion of the large bowel and anus were reviewed, the high mortality and the failure appreciably to lower this came as somewhat of a surprise. This group of obstructive conditions may be divided into those with or without communications and again into three types: type A, those with membranous obstruction or a stricture; type B, those with a blind rectal pouch and the anal canal absent; type C, those with a blind rectal pouch and the anal canal present.

Type A is the most amenable to treatment but constitutes only a small percentage of the total. However, many of these patients subsequently succumb in spite of regular dilatation to chronic fecal impaction and enormous hypertrophy of the colon. Whether this is simply due to the effects of mechanical obstruction or to an associated neuro-muscular imbalance does not appear to have been determined.

Type C is obviously liable to be missed early and diagnosed only when signs of intestinal obstruction are well advanced, with a consequent poor prognosis.

Type B constitutes the majority of cases and the patient should, if in good condition and amenable to such treatment, as evidenced by X-ray examination, have a primary perineal rectoplasty performed. The fact that the external sphincter is developed separately from the rectum results in normal sphincteric control in a number of these cases. Those who are in bad condition should have a colostomy performed with a minimum of investigation or disturbance and a perineal rectoplasty performed later if the condition is suitable.

Radiological Assistance in Diagnosis.

Plain films can give all the information required and the use of barium is not advocated because of the danger of inhalation of vomitus. Normally the jejunum occupies the left upper quadrant of the abdomen except where the

shadow of the transverse colon can be seen in continuity with the lateral colon. In infants gas shadows are normally present in the intestine and obstruction is therefore recognized and located by their absence.

Films should be taken with the patient in the antero-posterior, lateral, upright, and head-down positions to show the gas and fluid levels.

With a duodenal obstruction one may see the outline of a dilated duodenum and stomach.

With a jejunal obstruction only two or three dilated loops of small intestine may be seen.

With an ileal obstruction there may be multiple dilated loops of small intestine.

If the obstruction is complete no gas shadow will be seen below the dilated gut.

With an imperforate anus gas makes its way after birth to the most distal extremity of gut, but it may require up to twenty-four hours to do so. To get greater clarity of outline of gas in the rectal pouch it may be necessary to maintain the head-down position for ten minutes. A lateral view is of more value than an antero-posterior view in which the distance between perineum and rectal pouch may appear shorter because of the pelvic curve of the intestine.

With meconium ileus the characteristic findings of Neuhauser, already described, may be seen.

Conclusion.

Although much of the foregoing is concerned with diagnosis it must be made clear that it is not really important to diagnose the exact type of intestinal obstruction. What is important is to diagnose intestinal obstruction early and to act promptly. Procrastination with a reluctance to take surgical action is often an important factor in causing death. A small child with an abdominal scar from a previous operation for appendicitis or intussusception, sitting in bed with his hands on his abdomen, rocking himself to and fro because of intermittent pain, requires surgical intervention immediately, not on the surgeon's next operating day. That may be too late. Someone has wisely said: "It is always better to look and see than to wait and see." It is equally important to know what form of surgical procedure to adopt for each condition. The day of complete evisceration in the search for diagnosis, followed by some surgical procedure as an experiment, has gone.

HAND INJURIES.¹

By B. K. RANK,
Melbourne.

Military Practice.

DURING war years some of us were destined to the surgical care of a preselected group of patients, with a view to their management under optimum conditions of continuity and team work, and with the best facilities available. During seven years in a service plastic or reparative surgery unit one had the opportunity of treating a large number of mutilated hands. These could not fail to offer stimulus and scope to anyone keen on reparative work—stimulus because of the economic importance of management both to individual and State, scope because of the number of severe hand mutilations resulting from the hazards of modern war methods. The more mutilated the hand, the more important any slight improvement becomes, and we were often forced to strive very acutely for any chance of improvement, to attempt ambitious procedures for a possible slight improvement in function, procedures which could not be regarded as economic under civilian conditions. An operation not warranted for a hand otherwise intact may be of prime importance for

a hand with only two or three fingers and possibly the other hand in much the same state.

It would be a great mistake, however, should we fail to recognize that these patients with mutilated hands did constitute a freak group of selected cases. They came under our care at a relatively late phase in management after primary treatment, indicated by conditions, had been carried out rather in respect of raw principles of war surgery than on standards of finesse which we know to be right for the primary management of civilian hand injuries as typically seen from industrial accidents. Those, however, cannot be considered counterpart injuries.

From this group we learnt a great deal concerning the mobilization of stiff joints, the relief of scar contractures, the repair of nerves and the making good of bone and soft tissue loss by various grafting procedures. The problem of small joint stiffness was almost universal—stiffness not only from disuse because of actual tendon or joint damage, but more from the reactions of inflammation and oedema or immobilization which had been indicated in earlier phases of treatment.

In the secondary repair of hand injuries the plan of surgical reconstruction elaborated and the prognosis depend on joint function. We have found the principle of long continued light traction the best aid to restoration of joint mobility. This is really the application in reverse of factors which produce the common finger deformities—that is, the elastic tension of certain tendons unopposed by their antagonists. The principal methods used to effect this elastic traction are illustrated, and they follow essentially the principles of Bunnell's splints. Lateral capsulotomy was often found useful for metacarpal-phalangeal joints which had secondarily become stiff in extension—joints notorious for becoming frozen and always difficult to remobilize. The technique and rationale of this operation were well described by Mr. Gordon Shaw in early after years of the last war (December, 1920).

Only when a worth while range of joint mobility is obtained can the possibilities of secondary repair be considered in its two directions—to restore to normal function the parts of the hand remaining, and where necessary to make good or substitute for parts lost. Cases typical of those we handled, and results obtained, are illustrated in a film.¹ They exemplify the problems of secondary repair and the tedious involved.

Concerning tendon disabilities, which is the aspect of hand injury on which I wish to comment, in the war injuries everything was weighed against good results from the secondary repair of severed tendons.

Most cases of bone or tendon deficiencies or both were complicated by extensive scar disabilities. Not only had joints to be mobilized, but scars had to be radically replaced by normal soft tissue. This involved procedures often in many stages, and tendon repair had always to be left until the last stage or a future operation. Such were the technicalities and the time loss that muscles and nerve pathways could be in no fit state to resume function dramatically. Moreover, the diagnosis of tendon disability was always difficult, and could often be established only at operation. If after reestablishing joint mobility we find that a tendon is not functioning, it may have been severed, or it may be involved in scar tissue. If it is severed the ends may be closely adherent or widely separated by retraction and degrees of tendon loss—that is, wound destruction is complicated by the secondary factors of sepsis and immobilization.

Many more explorations of tendons were undertaken with a view to repair which was found to be impracticable than there were operative procedures on tendons, including tendon sutures, transplants and grafts. Among a group of 300 patients with hand injuries, 500 operations were performed, but among these there were only 57 tendon operations. The results obtained from 14 tendon grafts are as follows. The extensor tendon graft did well, as indeed any form of extensor tendon repair. There were some good results from flexor tendon grafts for deficiency between wrist and palm, but only in one case were we able

¹ Read at a meeting of the Section of Surgery and the Section of Orthopaedics and Physical Medicine, Australasian Medical Congress (British Medical Association), Sixth Session, Perth, August, 1948.

¹ Dr. Rank showed a cinematograph film illustrating his remarks.

to restore independent interphalangeal movement with grafts through the finger sheaths. In many cases good strong flexion of metacarpophalangeal joints was obtained through the grafts, and various degrees of fixed flexion deformity of interphalangeal joints which salvaged what otherwise would have been a useless finger. We are apt to forget that a stiff finger may be very useful, especially if fixed and short. On this small experience one would affirm Bunnell's basic requisites for successful flexor tendon repair, namely: (i) the appropriate joints must be mobile; (ii) the area must be free of scar defects; (iii) normal cutaneous sensation must be present.

Civilian Practice.

We have since had the opportunity of reparative surgery in civil practice, and the setting up of a clinic for this work in a teaching hospital, the Royal Melbourne Hospital. Owing to a happy spirit of give and take among the junior surgeons of that hospital (perhaps a beneficial war legacy), we have been enabled to treat a number of hand injuries under optimum conditions and have been afforded an increasing opportunity to do reparative work as a primary procedure. This is as it should be. After only a two-year period, we are seeing less and less of the problem cases of secondary disability akin to the war injury. Of 53 industrial injuries in patients treated by the plastic unit in one year, in 34 of them we had the opportunity of primary treatment. Twenty-nine of these were severe compound hand injuries. The results illustrated in the second film¹ show the wisdom of the trend in modern surgical practice which allows a patient to reap the benefit of cumulative experience and concentrated facilities of personnel, organization and equipment otherwise not obtainable. When we commenced this clinic a large proportion of our work concerned the secondary repair of hand injuries, some of them presenting the same problems as the war injuries. Despite the fact that the necessary procedures do give some dramatic results, such work is of dubious economy under civil conditions of a modern hospital in a large metropolis. It is no consolation for time spent on a scar-bound hand in mobilizing stiff joints and replacing scar defects, as essential and separate preliminaries at subsequent stages of repairing tendons and nerves, to know that at least the first two phases could well have been precluded by careful and adequate soft tissue repair at the primary operation. The contraindication to such procedures which existed under wartime conditions is no longer valid.

During 1947, 4,604 injured workmen and women reported to the casualty department of our hospital. In a lecture given at our centenary celebration earlier this year, some statistics of the problem of industrial injury in the Australian community are set out. It is for obvious reasons that just more than one-third of the reportable industrial accidents involve hand injuries.

All hand injuries presenting under normal conditions for primary treatment can be rendered clean surgical wounds fit to close. The main object of their primary treatment is an effective and complete soft tissue closure, no matter how severe the injury, what the tissue loss, or what tedium this may involve to the surgeon. Fractures and dislocations can be reduced, but whether or not tendons and nerves are repaired is a different matter. If the highest standards of primary healing cannot be anticipated with absolute confidence, the repair of tendon or nerve is generally ill-considered.

Some thought and understanding of the manner in which the injury was received, together with its subsequent first aid and casualty handling, is a much better guide to the likelihood of obtaining primary healing than academic consideration of time interval. We should be concerned not with indications for wound closure but with the technicalities of best achieving wound closure.

Considered in this light, the common hand injuries are of two categories which compare and contrast in their nature, causation, management and prognosis.

¹Dr. Rank demonstrated a second cinematograph film.

The "Untidy" Hand Injury.

Power-driven saws, power presses and buzz planes are the common sources of severe industrial hand injuries, but any mobile machinery may cause compound injuries of an untidy nature where ideal soft tissue healing may be problematical. By compound one means open wounds involving several tissues not necessarily just compound fractures. By untidy one means that the soft tissue wounds are usually multiple, of an irregular or jagged type, and skin edges are macerated whether or not skin loss has occurred. Though multiple fractures are the rule, tendons and nerves are rarely, or last, involved. Everyone must have noticed how fingers are often left attached only by tendons. These gruesome-looking hand injuries usually end in most satisfactory results. The main objects at primary operation are to close all soft tissue wounds and to trim or complete traumatic amputations.

Final appraisal of the damage and viability of injured structures can usually be made only by detailed examination during and after a surgical preparation of the wound. Tourniquets during operation should, if possible, be avoided, for not only is the viability of skin edges and skin flaps to be assessed, but that viability may be jeopardized by any long period of tourniquet avascularity. Macerated skin edges should be trimmed, not widely excised. Accurate skin suturing is the most important of all technical factors. Skin loss must be adequately recognized. Bare areas can be well closed by routine free split skin grafts, unless vulnerable structures, such as nerves, tendons, bare bone or joints are involved, in which case they can be covered by local transposed flaps with a free graft on any secondary defect. If a defect is too large, or its position unsuitable for a local flap, a primary direct flap from a trunk area is indicated. Any surgeon interested in hand injuries must be confident and competent with all these soft tissue manoeuvres.

Though fractures and dislocations should be reduced, tendon or nerve injury should be noted at the primary operation but the repairs left for secondary procedures. Adequate skin and fat cover for all such areas must be provided. With untidy injuries it is unwise to enlarge or to make further incisions as is usually indicated for effective tendon repair, and the after-treatment of a sutured tendon is generally incompatible with that of a fracture.

In completing traumatic amputations we should remove no more than necessary to effect closure. We can forget, in these injuries, arguments about the ideal site of finger amputation. An intelligent patient is usually the best deliberator in that regard.

Filleted soft tissue from an amputation stump or a useless finger may prove of inestimable value in secondary repair. It may alleviate the necessity for stage operations with cumbersome procedures and poses for the patient. So every time you think you are "cutting losses" (a phrase we often hear) by amputating what must obviously be a paralysed, anaesthetic or stiff digit, think for a minute lest you are also cutting off some heaven-sent material for future surgical repair.

Nor is it always right further to shorten already amputated stumps or fingers with areas of skin loss at the tip to effect closure. If the thumb, index finger or an already short finger stump is involved, or if there are other partial finger amputations on the same hand, repulping should be considered. By providing adequate bone cover in this way not only is length conserved but terminal osteitis is prevented and so, too, many of the adherent tender scars about finger tips which we are called on to treat at secondary operations.

The possibilities of ultimate reconstruction must always be envisaged at any primary operation, so that the best foundations are made for that end. Repair mindedness can be cultivated—ability to visualize the optimum end result and how to achieve it.

The "Tidy" Hand Injury.

The "tidy" hand injuries are caused by choppers, cutters, knives, axes or glass. They correspond with the common

types of household injuries and present no technical problem of soft tissue closure. Skin edges are clear cut and skin loss is rare. Fractures are the exception, but tendon and nerve section, or both, are the rule. Primary repair of all the injured structures is indicated, provided only that there is no real likelihood of infection being already established in the wound.

In the North Western University, Chicago, the home school of Kanavel, Sumner Koch and Michael Mason do a large amount of repair of hand injuries. It is of interest that the various hand infections which Kanavel described are now clinical curios there. As in war injuries of the hand, a major infection of the hand rarely follows a severe and hospital-treated hand injury. Hand infection usually accompanies the neglected or the home-treated minor injury. The complete disappearance of hand infection from the large field of hand injuries in Chicago is not due to antibiotics—it happened before that. It is due to the example and teaching which are perpetuated right down to the factory first-aid. In the street it seems almost that every second person wears a "Band Aid" on the finger.

Under ideal conditions—and tendons should never be repaired except under ideal conditions—I believe that primary repair of a tendon can be safely attempted in most patients reporting to hospital for primary treatment if the injury is of the "tidy" type. This statement is made for three reasons: (i) in two years we have had no case of infection complicating tendon repair—primary or secondary; (ii) penicillin cover is used as a routine—this is one of the great functions of antibiotics; (iii) we realize the difficulties associated with secondary tendon repair. Where muscles have retracted and wasted, the important element of tension in a tendon repair is extremely difficult to judge, especially as secondary repair usually involves a tendon graft.

With the tidy hand injury it is essential to determine precisely from simple tests and observations with the conscious patient what nerves and tendons have been injured. The surgeon must himself examine these patients before any anaesthetic is administered. Consideration of the position of the hand when the injury was received is always helpful. With a glass cut at the wrist, for example, when a clenched fist has gone through a window, it is not the proximal end which must be exposed by incision extension, but the distal end of the tendon may be retracted into the carpal tunnel. This always presents a difficult problem of identification. A tourniquet should be used to prevent any likelihood of secondary damage at operation, and to enable the necessary details of finesse to be carried out. Incisions have generally to be enlarged, and we should endeavour, especially on a finger, to approach the area concerned by raising a flap rather than by making an incision over the site.

The technique and prognosis of tendon repair depend on whether a tendon is injured in paratenon or in epitendon. As repair in epitendon or tendon sheath is a major problem, I will now pursue that subject only to make a few points which I have found of major importance among a host of detail, none of which can be neglected. They are illustrated from my own trial and error, and from first hand observations and discussions during the period of a Carnegie Travelling Fellowship in the United States of America devoted to this subject for this purpose. I had the opportunity of spending some time with Sumner Koch and Michael Mason in Chicago and of seeing the work of Bunnell and his school. American surgeons have led the world in this field, and those in Britain now doing the best work in this field, notably Pulvertaft, have all been led, stimulated and influenced by our American brothers.

1. It is futile to attempt tendon repair without the basic essentials as Bunnell lays down—that is, joints must be mobile, there must be no soft tissue scars or defects in the region concerned, and fingers must have normal sensation. At the wrist and in the palm local fat and areolar tissue should be freely used or a lumbrical muscle itself to cover and separate sites of tendon repair. There is a general tendency to go too far distally with the suture point in the palm.

2. Operation must always leave two clean and non-traumatized tendon ends in accurate apposition, with no exposure of any free cut end. Handling which produces tendon ends like tassels dragged together under suture tension to fit where they touch, cannot but fail. It is because of the finesse of atraumatic technique required that this work, the world over, is passing more and more to the hands of the plastic surgeon, or to surgeons who have studied and become expert at plastic technique. Much is written about technique and suture material. It is not the suture material—silk, nylon and stainless steel wire are all effective—nor is it the actual technique of inserting the suture which is nearly so important as the atraumatic technique with which a tendon must be handled. Boilermaker's tools are useless in a watchmaker's shop. If atraumatic technique and appropriate instruments are not available, a tendon should not be sutured. Bunnell's technique, if precisely carried out, gives an excellent alignment in an atraumatic way, but there is some sacrifice of tendon length as the ends are gripped with haemostats and have subsequently to be removed. I have found a tendon gripper made by my Perth colleague, Gilbert Henderson, most helpful in inserting Bunnell type stitches with ease and accuracy.

3. We must recognize the reaction of swelling which always occurs about the point of tendon suture. Tendons heal by callus in much the same way as bone does. In recognition of this, in a sheath only one tendon should be sutured, and if one tendon only is cut it should not be sutured lest the function of the remaining tendon be spoilt.

4. In my hands, best results have followed radical removal of the sheath which is completely cut away except for a few stirrups in appropriate places to prevent prolapse. It seems that a tendon is more easily nourished from fat than it is from a tendon sheath after the normal vincula attachments have been broken. Despite the fact that results from repair in this way may show some functional deficiency from lack of the sheath, as you may see in the film, in my hands the results are much better than if the sheath is left intact or just split open on one side and left open.

5. The posture of the hand to be maintained following suture is important. Relaxation is obtained by almost full flexion of the wrist and only a half grade of flexion at the metacarpo-phalangeal joint. Fingers should never be flexed over the palm.

6. No movement is carried out during the primary stages of union of callus formation—that is, for approximately three weeks. Then movement in the inner range is commenced, and from then on by successive plasters flexion is let out from the wrist and phalangeal joints. It is flexion we must encourage to recover, not extension. If a physiotherapist, experienced in these cases, cannot work with the surgeon and under his direction, it would be better for the surgeon to do the physiotherapy himself. The closest cooperation, supervision and management of the patient are required in this phase. Only experience tells which case to persist with, and which to write off.

7. If factors are not favourable for primary repair, early secondary repair is important, and here lies the importance of optimum primary management of the soft tissue wounds in all "untidy" injuries. Muscles rapidly waste, tendons retract and contract, so that after about two months any attempt at direct suture is usually under too much tension. In all these cases a graft is required, so arranged that there is no suture line within the sheath area. Results of grafts in practised hands are very good; so good that some surgeons, for example Pulvertaft in England, never do primary repair in a sheath area, but in all cases close soft tissue wounds and elect to do a secondary graft in a few weeks. The only primary sutures Pulvertaft would do in epitendon areas are of the *pollicis longus* tendons or the *flexor profundus* distal to the *flexor sublimis* insertion. I have not yet had the experience to arrive at a decision on this point. This is the most important problem now before us, and this year we hope to determine whether the results in a series of early secondary grafts are better than primary sutures in the sheath area.

Conclusions.

There are two general conclusions of this paper and the films I have shown.

1. There is no longer any room for the fatalistic attitude about severed flexor tendons. If joints are mobile and a finger has sensation, it is quite wrong to amputate a finger merely because flexor tendons are severed.

2. We cannot advance with the difficult problems of tendon repair unless the cases are concentrated among a few surgeons to enable some to handle sufficient numbers of patients not only to acquire and improve the order of technique required but to sift and try new methods which must arise. Only in this way can the essential team work function.

HEAD INJURIES IN CIVIL PRACTICE.¹

By LEONARD LINDON,
Adelaide.

In this brief paper it will be possible only to mention certain features in the management of civilian head injuries which seem to me to be of importance. And it is obvious that many equally important features must be omitted.

Civilian peace-time head injuries present problems which differ somewhat from those incurred in action. But there is no reason—other than that of organization—why the astonishing results of service surgery should not be translated into civilian practice. Due emphasis will be laid upon organization in a later section of this paper.

Early Operative Interference.

I am in the habit of teaching students that there are only two absolute indications for early operative interference: (i) open wounds of the scalp, (ii) evidence of a progressive localized compressing lesion.

Dr. B. K. Rank will have dealt adequately with the principles of treatment of wounds of soft tissues, and I will only emphasize certain points which particularly apply to head injuries.

The Scalp Wound.

Every effort must be made to obtain primary union of the scalp. Even though facilities are not available for a thorough toilet of the brain *et cetera*, the best preventive of cerebral infection is a closed scalp.

Penetrating Wounds of the Brain

It had long been considered that one of the worst features in the course of a severe head injury, whether closed or open, was the development of post-traumatic oedema of the brain. One would therefore surmise that, in the case of penetrating brain wounds, it would be highly desirable to leave the *dura mater* open, as a means of providing decompression for the subsequent swelling. But the practice of service neurosurgeons was the exact reverse, and the greatest emphasis was laid upon the closure of the dural defect at the first operation, fascial grafts being used where necessary. With regard to gun-shot wounds, the results show that post-traumatic oedema of the brain is very seldom of such a degree as to need actual decompression. I am not certain that the same can be said of the gross penetrating wound of the brain met with in civilian practice, most commonly as the result of a "head-on" motor vehicle injury. I hope I am correctly quoting conversations with Cairns, but I understood him to say that the actual damage to brain substance was more extensive and diffuse when the rapidly moving head struck a stationary object than when a very rapidly moving missile penetrated the stationary head. If this is so, it

¹ Read at a combined meeting of the Section of Surgery and the Section of Orthopaedics and Physical Medicine, Australasian Medical Congress (British Medical Association), Sixth Session, Perth, August, 1948.

would explain the impression which I have gained, that the *dura* may safely be closed after excision of brain damaged by a missile or after the excision of a tumour, but that it is not always safe to close the *dura* over a brain which is grossly lacerated and contused as the result of a head-on collision.

It is true that many closed head injuries which result in death at no time are accompanied by a rise in cerebro-spinal fluid pressure; but local and fatal hypothalamic injury can occur without any increase in intracranial pressure. However, I still think that one must be prepared for some gross swelling of brain in severe civilian accidents.

Frontal Sinus and Rhinorrhœa.

The head-on type of civilian injury is particularly prone to cause a fracture which involves the frontal sinus and then runs backwards along the floor of the anterior fossa, opening up the ethmoid air cells or the optic foramen. The immediate risk is meningitis from an infected sinus; the later risk is the development of cerebro-spinal fluid rhinorrhœa and meningitis. Prior to the use of chemotherapy, either of these complications carried a high mortality rate.

In the case of a closed head injury with fracture involving the outer wall of the frontal sinus, intensive chemotherapy will probably protect the patient from the immediate risk of meningitis, and an expectant attitude will be justified. But if a closed depressed fracture should involve the posterior wall of the sinus also, the decision becomes more difficult, and I feel that it is wiser to forego the risk of meningitis by exposure.

In the treatment of the open fracture there is no choice; the mucous membrane of the sinus is removed, the underlying condition of the *dura* dealt with and primary closure of the scalp effected; chemotherapy is, of course, instituted.

Immediate cerebro-spinal fluid rhinorrhœa lasting for a few days is not uncommon. But the more serious type is that which develops after two or three weeks, commonly after the patient becomes ambulant. Under the protection of penicillin this may be treated expectantly at first, as the rhinorrhœa frequently ceases spontaneously. But should the rhinorrhœa persist freely, or should it recur after having once ceased, it is without doubt safer to attempt to close the dural defect in the anterior fossa through which the leakage is occurring.

Hæmorrhage.

Certain intracranial hæmorrhages constitute the second absolute indication for early operation in closed head injuries. These are not common, and can be diagnosed with reasonable certainty only if repeated examinations are carried out and the results of the examination are recorded fully on each occasion. It is doubtful whether operative interference is likely to be of any benefit to the patient unless the examinations reveal evidence that the lesion is both localized and progressive.

Nursing Problems.

The patient suffering from a severe head injury with prolonged unconsciousness demands special nursing.

1. The position of the patient is important. Cairns advocated elevation of the foot of the bed, with the patient's head turned well to the side, to prevent aspiration of vomitus or secretions from the pharynx. On the other hand, the elderly, unconscious patient, with a tendency to pulmonary stasis, is probably better nursed on his side or in a semi-Fowler position. The latter position is favoured by many on the grounds that it lessens the tendency to intracranial venous engorgement.

2. The importance of feeding is often ignored. The unconscious, restless and often vigorously active patient cannot maintain his condition on a diet of sweetened water given by spoon feeding. In the feeding of all except the deeply unconscious patients, it is possible to pass a duodenal tube through the nasal passage into the stomach and then to administer an adequate fluid mixture of milk, egg, sugar, salt, fruit juice *et cetera*, at regular intervals.

Sedatives may also be administered by the indwelling tube, and the work of the nurse rendered much easier and more certain. The condition of an unconscious patient may be well maintained in this manner for weeks.

3. The violent irritability of some patients can be dealt with only by restraining straps, particularly if insufficient nurses are available. But in my experience, by the administration of bromide, chloral and "Luminal" by stomach tube, it is seldom that restraint is necessary for long—and it is certainly undesirable. After the first day or two I think that the value of the judicious use of morphine far outweighs the dangers imputed to it.

Associated Spinal Injury.

Associated spinal injury is easily overlooked in the early stages of management of a severe head injury. Two types should be borne in mind.

(i) Injury to the lumbar part of the spine is most likely to occur in association with head injury, when the patient has been thrown out of a moving vehicle or has fallen from a height. The injury then is generally a crush fracture of a lumbar vertebra. (ii) Injury to the cervical part of the spine is more apt to occur in a head-on injury and may well be fatal. But generally the cervical injury concerns the intervertebral disks or apophyseal joints, and at a later date is the cause of occipital or brachial root pain. Occipital nerve involvement is the more common, and leads to persistent occipital neuralgia and considerable disability.

These complications must be borne in mind and sought for.

The opinions and criticisms which follow are based on practice in South Australia; I feel certain that the organization for treating head injuries must be better in other States than in my own State, and I therefore realize that much of what follows is probably already accepted practice elsewhere.

Management.

The management of head injuries falls naturally into two sections: (i) the immediate or life-saving treatment; (ii) the later management, upon which depend morbidity and economic recovery.

Immediate Treatment.

Industrial expansion and the increasing tendency towards reckless, uncontrolled and inconsiderate driving of high-powered vehicles, have contributed largely to the fact that the proportion of "head injury" admissions to the Royal Adelaide Hospital is increasing each month. Many of these head injuries are minor in nature and are not productive of any subsequent morbidity, and it is difficult to argue against the statement that there is no need to refer such casualties to the care of a head injury clinic. But with regard to the management, both immediate and remote, of the patient with a severe head injury (that is, all persons with compound head injuries, and those admitted to hospital in a state of deep unconsciousness), in my opinion the weight of evidence in support of management by one head injury clinic is overwhelming. Note that I have not claimed that it should necessarily be a neurosurgical clinic, although I feel convinced that teams which are accustomed to general neurosurgical technique will achieve better results in the treatment of gross head injuries than the average good general surgical team. But the first point is this: in any one year the number of patients with gross head injuries in the Royal Adelaide Hospital is not very large, and some of these are in a hopeless condition at the time of admission. When the patients are spread among six equal surgical teams, it means that not one of the teams will obtain sufficient experience to become expert in diagnosis, operative technique and judgement, or subsequent management. On the other hand, any one team handling the total annual number of patients with severe head injuries could not possibly fail to learn much, and to improve its judgement and technique, to the great benefit of the injured patients. I emphasize the development of judgement even more than technique, and if more post-mortem examinations were con-

ducted at the Royal Adelaide Hospital, I am certain that the unexpected findings would support my claims. No one man amongst us will ever learn enough of these cases to avoid errors in diagnosis and failure in judgement; but the errors made by any one team will be in inverse proportion to the number of patients committed to its care. The reference of a patient to a consultant clinic for opinion little benefits the patient, the surgical team or the consultant clinic. The handling of these severely injured persons is a matter of management from their admission to hospital to their discharge, with observation and recognition of the many problems that may arise.

I myself believe that the team best fitted to deal with such cases is the neurosurgical team; but if that is not acceptable, then let one general surgical team concentrate upon these cases, under the designation of "head injury clinic".

Secondly, let us consider post-mortem examinations. In Adelaide we are unfortunate when compared to some general hospitals, in that permission to perform post-mortem examinations is not a condition of admission to hospital, but must be obtained from the next of kin—an obviously undesirable and embarrassing procedure. Fortunately the present City Coroner is fully seized with the enormous value to science and the public of information obtained by post-mortem examination of persons who have suffered fatal head injuries; the full value of such examinations will be obtained only if the autopsy is conducted by, or in the presence of, the surgeon responsible for the case. And this is another argument in favour of concentrating these severely injured patients in one clinic.

Thirdly, with regard to the teaching of students: there is no possible reason why the concentration of patients with severe head injuries in one clinic should interfere with the teaching of students. It is simply a matter of allocation of students. And to state the matter with rather brutal frankness, it would be better to teach them the methods of one reasonably experienced team, than the methods of six clinics of varying interests and neurosurgical ability.

Remote Management.

I must repeat that the criticisms which follow are based on conditions obtaining in Adelaide. A considerable number of persons with head injuries, even of the severely injured, make a complete physical, mental and economic recovery. But we still see a large number of patients who develop the symptoms described under the all-embracing term of post-traumatic psychosis. To this the following factors contribute.

1. The pre-traumatic psychic status of the patient. One cannot help being struck by the fact that the majority of cases of post-traumatic psychosis occur after relatively slight head injuries in immature young people with unstable personality, and frequently the children of parents of subnormal mental standards. This may sound rather sweeping; but it is the best description which can be given by one who is not a psychiatrist. And this jaundiced observer considers that this type of young person is to be seen in greater numbers today in Australia than ever before.

2. Economic factors. Many a good type of workman, with family responsibilities, is gravely concerned by the loss of wages, which is still considerable, in spite of the provisions of the *Workers' Compensation Act*. Others, of less worthy standards, are determined to extract all the compensation they can, without work; this is more often true of unmarried men.

Yet again, some such patients are unwilling to go back to a job for which they at no time had any great aptitude or liking. It was just a job, a means to a wage. And rather naturally, they do not make much effort to resume that job.

3. Problems of convalescence. These apply to the working-class victims of all illness or injury. As far as the Act is concerned, a man either is unfit for any work or is expected to go straight into a seven-and-a-half-hour day of work, five days a week. It must be stated that many industrial concerns, private and public, do their

utmost to take on their old employees on light work for a few weeks, if the position is fully explained to them. But this is not the answer to the whole problem. And I must refer to the work being done by the Rehabilitation Division of the Social Services Department in this State, as I believe it is providing a much-needed service to those members of the community who come within the scope of its benefits; but at present it can help only ex-members of the services.

This organization provides, amongst other benefits, the following during a period of convalescence from head injuries: (i) general physiotherapy, (ii) occupational therapy, helping to work the patient gradually into the state in which he is physically and mentally able to do a full day's work for five days a week; (iii) vocational training, for those who are temperamentally unsuited for their previous job, or who, as the result of their head injury, are physically unfit to return to their occupation.

Conclusion.

I consider that this type of rehabilitation should be extended to all members of the community, and that it would lessen the psychiatric problems following head injuries. To this end, I believe that any clinic which is responsible for the management of persons who have sustained severe head injuries should be strengthened by the addition of a neurologist or a good sensible psychiatrist, or both. I should like to conclude by repeating my conviction that, for the best results, the management of the person with a severe head injury should be in the hands of one such "head injury team", from his admission to hospital to his final return to work.

THE VALUE OF ALBUMIN-FORTIFIED ANTI-RH SERUM FOR RH TESTING.¹

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THE Wiener conglutination technique⁽¹⁾ has made it possible to use serum which contains only univalent ("blocking") Rh antibodies, in tests for the Rh factor, at times

¹ This work was made possible by a grant from the National Health and Medical Research Council of Australia.

when supplies of the rarer potent Rh agglutinating sera temporarily fail. This does not, however, solve all the difficulties in centres where large scale testing has to be carried out because this method involves increased labour in the laboratory.

Since most specimens of blood must be tested for the blood group as well as for the Rh factor, it is necessary to prepare two types of red cell suspensions if the conglutination technique is used in tests for the Rh factor. For ordinary blood grouping the red blood cells are suspended in saline or Rous-Turner solution, so that false reactions due to rouleaux formation are eliminated. In the conglutination method the red blood cells are suspended in pooled serum or oxalated plasma of the appropriate blood group, so that those which are Rh-positive can be clumped by serum containing univalent ("blocking") Rh antibodies.

It is also not always possible to maintain an abundant supply of pooled sera of each blood group for the preparation of large numbers of red cell suspensions.

It seemed probable that these difficulties might be overcome if ordinary saline suspensions could be tested directly with sera containing chiefly "blocking" antibodies. In a recent paper Wiener and Hurst⁽²⁾ refer to an observation by Elliot that fortification of human anti-Rh serum, containing univalent antibodies, by the addition of a suitable quantity of a 25% solution of human albumin, enhanced both the avidity and the titre of the reaction. If it could be shown that this was not a chance observation but was true for large numbers of sera, it would be of great practical value. The albumin necessary for the conglutination effect could be added to the testing serum instead of the red blood cells. From this point of view 24 sera which could no longer be used for the Rh agglutination test, because their titre had gradually decreased to scarcely detectable levels, were subjected to the following tests.

Each specimen was fortified by the addition of one part of bovine albumin (Armour Laboratories) to four parts of anti-Rh serum. Each of the resultant albumin anti-Rh serum mixtures was tested against two Rh-positive and one Rh-negative cell suspensions.

In order to keep the amount of Rous-Turner mixture which enters these conglutination reactions at a minimal level, a very small drop of cell suspension must be used. For this reason the concentration of the cell suspension should be approximately 10%. This suspension can be used quite satisfactorily for the ordinary blood grouping. Glass slides divided into twelve rectangles were used and four fortified anti-Rh sera were tested against the three

TABLE I.
Comparison of the Reaction of Rh-positive Cells with Anti-Rh Serum and with the Same Anti-Rh Serum Fortified with Bovine Albumin (4:1).

Serum Number.	Blood Group.	Cells and Anti-Rh Serum.						Cells +1 Drop of Albumin-Serum Mixture (1 to 4).					
		30 Minutes.			1 Hour.			30 Minutes.			1 Hour.		
		Rh+	Rh+	Rh-	Rh+	Rh+	Rh-	Rh+	Rh+	Rh-	Rh+	Rh+	Rh-
1	A	—	—	—	—	—	—	—	—	—	—	—	—
2	A	—	—	—	—	—	—	—	—	—	—	—	—
3	A	—	—	—	—	—	—	—	—	—	—	—	—
4	A	—	—	—	—	—	—	—	—	—	—	—	—
5	A	2	2	—	—	—	—	—	—	—	—	—	—
6	AA	1	2	—	—	—	—	—	—	—	—	—	—
7	AA	1	2	—	—	—	—	—	—	—	—	—	—
8	AB	W	W	—	—	—	—	—	—	—	—	—	—
9	B	1	3	—	—	—	—	—	—	—	—	—	—
10	B	W	W	—	—	—	—	—	—	—	—	—	—
11	B	—	—	—	—	—	—	—	—	—	—	—	—
12	B	—	—	—	—	—	—	—	—	—	—	—	—
13	B	—	—	—	—	—	—	—	—	—	—	—	—
14	B	2	4	—	—	—	—	—	—	—	—	—	—
15	O	4	1	—	—	—	—	—	—	—	—	—	—
16	O	W	W	—	—	—	—	—	—	—	—	—	—
17	O	—	—	—	—	—	—	—	—	—	—	—	—
18	O	4	2	—	—	—	—	—	—	—	—	—	—
19	O	2	1	—	—	—	—	—	—	—	—	—	—
20	O	—	—	—	—	—	—	—	—	—	—	—	—
21	O	—	—	—	—	—	—	—	—	—	—	—	—
22	O	—	—	—	—	—	—	—	—	—	—	—	—
23	O	—	—	—	—	—	—	—	—	—	—	—	—
24	O	W	W	—	—	—	—	—	—	—	—	—	—

W=weak reaction.

cell suspensions at the same time. After the fortified serum and the cell suspension were mixed, the slides were incubated at 37° C. in a moisture chamber and were inspected for clumping after thirty minutes and again after sixty minutes. The slides were gently rocked so as to rotate the cell-serum mixture in a clockwise direction and by this method the breaking up of the cell-serum mass into clumps could be readily detected. Control tests in which the same sera without the addition of albumin had been incubated with the same cell suspensions were also examined. From Table I it will be observed that sera numbers 3, 4, 5, 8, 17, 19, 20, 21, 22 and 24 caused such slight agglutination of the Rh-positive cell suspensions even after incubation for sixty minutes that it was impossible to use them for Rh testing. The same sera fortified with albumin and tested against the same cells gave gross and consistent clumping after only thirty minutes' incubation. The reactions were even stronger at the end of the hour.

TABLE II.
Comparison of the Agglutination, Standard Conglutination and Albumin Conglutination Reactions of Sera Containing Little or no Rh Agglutinins.

Serum Number.	Group O Cells Suspended in									
	Saline.			Pooled Serum.			Albumin-Serum Mixture.			
	Rh+	Rh+	Rh-	Rh+	Rh+	Rh-	Rh+	Rh+	Rh-	
1	—	—	—	1	1	—	4	4	—	
2	—	—	—	4	4	—	4	4	—	
7	—	—	—	4	4	—	4	4	—	
10	—	1	—	W	1	—	4	4	—	
11	W	1	—	3	2	—	4	4	—	
12	—	1	—	4	2	—	4	4	—	
13	W	W	—	4	4	—	4	4	—	
16	W	W	—	4	1	—	4+	4+	—	
23	—	—	—	1	1	—	4+	4+	—	

W = weak reaction.

Although agglutination was quite visible with sera numbers 6, 9, 14, 15 and 18, erratic results had been obtained in previous tests and they were therefore no longer used for routine testing. Gross clumping resulted when they were fortified with albumin and tested against the same cell suspensions.

Sera numbers 1, 2, 7, 10, 11, 12, 13, 16 and 23 which caused little or no agglutination of the Rh-positive cells were not improved by the addition of one part of albumin to four parts of the serum. This group of sera were then tested for blocking antibodies by the standard conglutination and the albumin-conglutination methods of Wiener to see whether any Rh antibodies were still present in the serum. (Table II.) All traces of antibodies had disappeared from serum number 2.

When mixtures of equal parts of albumin and each of the other sera in this group were incubated with similar red cell suspensions to those already described, marked

clumping occurred in the presence of the Rh factor. (Table III.)

In these experiments it has been shown that saline suspensions of red blood cells can be tested for the Rh factor by direct incubation with serum containing blocking antibodies, provided these are fortified by the addition of a suitable concentration of bovine albumin. Rh-positive cells show gross clumping after incubation for thirty minutes at 37° C. if only a small drop of cell suspension is used. This precaution is necessary and may be explained by Wiener's statement that slight dilution of plasma or serum with isotonic aqueous solution causes the dissociation of the albumin globulin complex "conglutinin" into albumin and globulin. These in themselves have little or no conglutinating activity.

Since these investigations were completed it has been necessary to use fortified serum for routine testing in this laboratory. In nearly 1000 tests for the Rh factor there has been complete agreement between the results obtained with potent Rh agglutinating serum and with albumin-fortified Rh blocking serum.

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Reports of Cases.

TWO UNUSUAL CASES OF DISEASE OF THE ALIMENTARY CANAL.¹

By L. HARDY WILSON,
Launceston.

Case 1.

My first case is that of a male patient, aged sixty years, who was referred to the Launceston General Hospital for investigation, with the diagnosis of possible gastric ulcer.

On his admission to hospital he gave a history of having suffered from increasing breathlessness for some months, and of dyspepsia, consisting of anorexia, nausea and flatulence, for the previous three weeks. He was losing weight steadily. The urine was dark in colour and he had to pass urine two or three times at night. The bowels were open regularly. His only previous illness was an attack of pleurisy thirty years before.

On physical examination of the patient the heart was normal. The lungs were dull to percussion towards the bases posteriorly, where the breath sounds were faint and crepitations were heard. Gross ascites was present in the

¹ Read at a meeting of the Royal Australasian College of Surgeons, Launceston, May 22, 1948.

TABLE III.
Comparison of the Reactions of Rh-positive Cells with Anti-Rh Serum, with the Same Anti-Rh Serum, Fortified with Bovine Albumin (4:1) and with Anti-Rh Serum and Albumin in Equal Parts.

Serum Number.	Blood Group.	Cells plus Anti-Rh Serum.						Cells plus One Drop of Albumin Serum Mixture (1:4).						Cells plus Equal Parts of Anti-Rh Serum and Bovine Albumin.								
		30 Minutes.			60 Minutes.			30 Minutes.			60 Minutes.			30 Minutes.			60 Minutes.					
		Rh+	Rh+	Rh-	Rh+	Rh+	Rh-	Rh+	Rh+	Rh-	Rh+	Rh+	Rh-	Rh+	Rh+	Rh-	Rh+	Rh+	Rh-			
1	A	—	—	—	—	—	—	—	—	—	1	2	—	2	4	—	3	4	—			
7	A	W	1	—	W	1	—	W	2	—	1	2	—	2	3	—	4	4	—			
10	B	1	1	—	W	2	—	—	W	3	—	W	3	—	2	2	—	3	3	—		
11	B	—	—	—	—	—	—	1	—	1	1	—	1	1	—	2	2	—	3	3	—	
12	B	—	—	—	—	—	—	W	4	—	—	4	—	4	4	—	4	4	—			
13	B	—	—	—	—	—	—	1	—	1	1	—	1	1	—	3	4	—	4	4	—	
16	O	W	1	—	W	2	—	W	3	—	1	W	—	1	W	—	2	4	—	3	4	—
23	O	W	2	—	W	3	—	1	W	—	1	W	—	1	W	—	2	4	—	3	4	—

W = weak reaction.

abdomen, through which no mass or viscus was palpable. Both legs were oedematous. The systolic blood pressure was 160 millimetres of mercury. Examination of the other systems revealed no relevant abnormalities. At this stage the following possible diagnoses were put forward: carcinoma of the stomach or of the head of the pancreas with metastases in the liver, chronic nephritis, congestive cardiac failure, tuberculous peritonitis or Pick's disease.

Investigations were carried out with the following results. The urine had a specific gravity of 1028, was acid in reaction, and contained bile salts and acetone. The result of the hippuric acid liver function test was 60% of normal. *Paracentesis abdominis* yielded eight pints of straw-coloured clear fluid; microscopic examination revealed lymphocytes and large endothelial cells, no malignant cells being seen. The Kline test produced a negative result. The fractional test meal examination resulted in a total acid curve rising to 50% N/10 sodium hydroxide with 40% free acid, which remained at that level from the first to the second hour. X-ray examination was made after a barium meal, the report by Dr. W. P. Holman being as follows: "Gross ascites which prevented an accurate screening. No gross abnormality detected in the upper alimentary canal. Throughout the examination good filling of the colon was not obtained. It is considered that the unusual lie of the colon is probably due to the ascites."

The Van den Bergh reaction was not obtained. The blood urea content was 30 milligrammes per 100 millilitres of blood. Blood examination showed the haemoglobin value to be 80%; the leucocytes numbered 11,000 per cubic millimetre, which in the film were seen to be mostly old polymorphonuclear cells. The result of the hippuric acid test, repeated one month after the patient's admission to hospital, was 84% of normal.

The question of laparotomy was then considered. The patient was very ill and operation was deferred. However, after eight weeks in hospital operation was advised and was refused by the patient.

During the succeeding weeks his condition steadily deteriorated and he died suddenly from pulmonary embolism thirteen weeks after his admission to hospital. In that period *paracentesis abdominis* had been performed seven times, a total of 83 pints of fluid being withdrawn. In each instance the cells seen were lymphocytes or large endothelial cells.

A post-mortem examination was performed. A large embolism was present in the main pulmonary artery. The heart appeared normal. There were pleural effusions on both sides, the lungs being partly deflated by them. Above the right side of the diaphragm and outside the pleura was a chain of enlarged lymph glands; these were in the lateral portion of the inferior mediastinum.

In the abdomen considerable ascites was present. The proximal portion of the colon was grossly distended. The coils of the small intestine ran in S-shaped loops with adhesions between the adjacent loops. In three separate places at distances of approximately one foot, ten feet and fifteen feet from the duodenum respectively, obvious tumours about one inch in diameter were found. These consisted of whitish, firm growths situated in the layers of the mesenteric peritoneum and hard up against the mucous membrane of the small intestine, the muscle in each case being displaced. The two more proximal tumours had not infiltrated the mucosa. The distal tumour was the largest, with a diameter of two inches; it had produced slight ulceration of the mucous membrane with infiltration around the lumen outside the mucosa. There was no obstruction. The mesenteric veins were empty and no enlargement of mesenteric lymph glands was noted.

The liver was enlarged and showed some venous congestion, but no metastases. The omentum had a reddened, indurated appearance, and part of it was found tucked through the foramen of Winslow into the lesser sac.

Of the remaining lymph glands, there was only one, in the right supraclavicular region, which was enlarged.

Dr. R. Y. Mathew reported on the tumours as follows:

The masses in the small intestine are similar, firm and homogeneous. On sectioning they show a uniformly cellular tumour composed of lymphocytes. Infiltration

of tumour cells is present in the omentum and in varying degrees in other tissues. I consider the condition primary lymphosarcoma of the small intestine.

Dr. Rupert Willis also kindly examined sections of the tumours and agreed with this diagnosis.

Comment.

The condition may be called one of the more frequent of the rarities. Staemmler in 1923 analysed 54,000 autopsies in German and Austrian hospitals and found 33 cases, an incidence of 0.06%. Lincoln Lewis in 1939 stated that nearly 400 cases had been reported. The chief modern published work on the subject is by Ullman and Abeshouse, who made a comprehensive review of 126 cases in 1932. The progressive total of reported cases was then 375, including small and large intestines; the incidence in the former was twice as great as that in the latter.

Lymphosarcoma of the intestine may occur as an annular or as a polypoid growth. The latter may be multiple, as in this case. The tumours are localized outgrowths projecting into the lumen. The growth begins in the lymphoid follicles of the submucosa. It infiltrates the other coats and may ulcerate the mucosa, but rarely penetrates the serous layer.

Microscopic examination of the growth may show it to be of small or large round-cell type.

Metastases are almost invariable.

The present case is of interest for the following points: (i) The glandular involvement was unusual. The mesenteric glands were not macroscopically involved, while those above the diaphragm and right supraclavicular region were. (ii) No explanation of the massive ascites was discovered. The tumours were far too small to cause mechanical obstruction of the *vena cava*.

Case II.

The second case is that of a marine engineer, aged fifty-nine years, who had spent his professional career in the service of a large steamship company. Six weeks before being examined in Launceston he was nearing the end of a voyage from Vancouver to Melbourne. He began to experience epigastric pain of a constant dull aching character. This seemed to be aggravated by food. As his illness developed, the pain was occasionally felt in the back and in the region of the right scapula. Soon after the onset rigors occurred and he became feverish. His bowels had previously been open regularly, but he became constipated. He had suffered from *diabetes mellitus* for four years and had been taking a 2000 Calorie diet with five units of soluble insulin twice a day.

On the arrival of his ship in Melbourne he was visited on board by the steamship company's doctor. He was found to have severe glycosuria and a raised temperature. Next day he collapsed in the doctor's surgery and was sent to hospital. He was there examined by a well-known consultant physician, who, as reported by the company's doctor, found "no focus of infection" and considered that there was "a possible myocardial weakness with a temporary virus infection to account for the temperature". He was treated with insulin, 20 units twice a day, and suitable diet, with penicillin, 50,000 Oxford units twice a day (the method of administration was not stated), and with a mixture containing digitalis. After two weeks he was able to get up, and at the end of the third week in hospital he was allowed to come to Launceston to convalesce.

Within a day of his arrival here he found it necessary to summon medical aid. The epigastric pain was again present and he was disinclined for food. His self-ordered diet corresponded to a number 1 ulcer diet in character. His temperature was 100° F., his pulse rate was 80 per minute, and his systolic blood pressure was 170 millimetres of mercury. The heart sounds were normal. Examination of the lungs revealed no abnormality. The abdomen was lax and no abdominal mass or viscus was palpable. He was again constipated. The diabetes was well controlled. After several days of observation he was transferred to hospital. X-ray examination after a barium meal was

performed by Dr. W. P. Holman, whose report reads as follows:

There was some general enlargement of the heart, especially the left ventricle. The stomach was small and high. It emptied completely within 6 hours when the head of the meal had reached the Caecum. There was considerable amount of widely scattered residue in a rather high ileum. Nothing abnormal was detected in the stomach or Duodenum. After 24 hours the head of the meal had reached the Hepatic Flexure and there was still some residue in the ileum. A long normal looking appendix was seen. After 48 hours there was hardly any progress of the meal in the colon, and this position was maintained after 72 hours. On this evidence there would appear to be a real obstructive lesion close to the Hepatic Flexure. On the other hand, when the colon was well outlined by gas it looked normal in size and shape all the way round.

Blood examination by Dr. R. Y. Mathew gave the following information. The haemoglobin value was 80%; the leucocytes numbered 16,000 per cubic millimetre; examination of a film revealed an increase in polymorphonuclear cells; examination of the erythrocytes revealed variation in size. Attempted culture of microorganisms from the blood resulted in no growth after seventy-two hours' incubation. The Widal test gave a negative result. Microscopic and cultural examination of the faeces gave negative results.

Two days after the patient's admission to hospital jaundice developed and the temperature reached 103° F. All food and fluid caused epigastric pain.

On the third day penicillin was administered, 40,000 units to begin with, followed by 20,000 units every three hours. Insulin was given in doses of 10 units twice a day.

In the next few days the patient was very nauseated, and after the barium meal examination the abdomen was distended and he vomited several times. Two enemas failed to produce much of the barium.

At this stage the diagnosis, which had seemed to lie in the direction of a medical condition, began to assume more of a surgical aspect. Carcinoma of the colon was suspected. The penicillin, of which the administration of 1,500,000 units in eight days had had no effect on the temperature or condition of the patient, was stopped.

As a final diagnostic test to eliminate amoebic infection, six daily injections of emetine were given, also without effect. The leucocyte count was now 28,000 per cubic millimetre.

On the twentieth day in hospital laparotomy was performed, the provisional diagnosis being carcinoma of the colon.

At the operation (performed by Dr. G. M. W. Clemons) a right upper paramedian incision was made. Free fluid was present. The first view showed the omentum to be adherent to the liver in the region of the hepatic flexure. When this was freed, the colon itself was found to be normal. The omentum and mesentery were swollen and indurated. The surgeon described the mesenteric root as standing up like the keel of a boat. This was considered to be due to cellulitis. The stomach was next examined. Its wall appeared indurated and thickened over the greater curvature and lower portion of the anterior surface. An area on the anterior surface proximal to the pylorus was selected for incision, with a view to exploring the interior of the stomach. As the knife penetrated the muscularis layer about two drachms of frank yellow pus appeared. There was in fact an intramural abscess of the stomach wall. No other abnormality being found, the wound was closed with drainage.

The patient's condition was now only fair. Penicillin administration was recommenced and sulphadiazine was exhibited, the latter being given through the intravenous saline drip apparatus now installed.

Much of the interest of the case was still to come. Dr. R. Y. Mathew reported on the pus and on a section of the stomach wall as follows: "Smear of pus showed Gram-negative bacilli. Culture grew organisms identified as Friedländer's bacillus. Cultures proved sensitive to streptomycin, but not to penicillin or soluble sulphathiazole.

Sections of the tissue showed inflammatory cellular infiltrations between bundles of muscle cells. The infiltrations consist of lymphocytes and a few rather larger cells with large nuclei not unlike Reed-Sternberg cells."

On this information the administration of penicillin was stopped and that of streptomycin was commenced on the third day after operation. The dosage was 0.25 grammes intramuscularly every three hours. Owing to the very short supply of the drug, higher dosage was not practicable. In fact, in the subsequent days an Australia-wide search was made for supplies to keep the treatment in progress.

On the third day the temperature fell to normal and did not rise again. On this same day the patient noticed a sudden acceleration of his pulse rate and later felt faint and giddy. The sister reported that his pulse was fibrillating, his colour was grey, and his features were pinched and death-like in appearance. On examination he was found to have a paroxysmal tachycardia with an apex rate of 220 per minute. He was given "Digoxin", the first dose being administered intravenously. The pulse rate was reduced to a variable range from 110 to 150 per minute until the eighth day after operation, when it fell suddenly to 72 per minute.

In the subsequent days the abdomen became distended and gross oedema of the lower extremities, scrotum and sacral region developed. On the fifth day pale yellow fluid in "fair amount" drained from the abdominal incision. The leucocyte count was now 44,000 per cubic millimetre. On the thirteenth day after operation the patient complained of his vision; he said that everything appeared whitish. He was feeling dizzy. He was pale and the pulse was weak, the rate being 104 per minute. He was given serum and blood transfusion in the following days, but his condition gradually declined. He collapsed suddenly and died on the eighteenth day after operation.

The total amount of streptomycin given was 14 grammes. The dosage had to be reduced to 0.125 grammes every four hours for a time owing to the fluctuation in supplies. The drug did not appear to have had any influence on the course of the disease.

It was not possible to perform an autopsy.

Comment.

The first of the chief points about the case is its absolute rarity. As far as can be ascertained, no like case of disease of the stomach or mesentery has been reported. Friedländer's bacillus, a member of the Klebsiella group, is best known as a cause of pneumonia. Friedländer's bacillus pneumonia has been successfully treated with streptomycin in Australia. Friedländer's bacillus is stated to be normally present in the buccal cavity of 4.5% of persons and in 5.5% of normal faeces. It is also known as a cause of septicæmia, of suppurative appendicitis, of cystitis, of pyelonephritis, of ulcerative endocarditis, of endometritis and of brain abscess.

The second point is the failure of streptomycin *in vivo* after having been proved effective *in vitro*.

Acknowledgements.

We were particularly fortunate to have the services of Dr. R. Y. Mathew for the bacteriological work. The medical superintendent of the Launceston General Hospital, Dr. M. Fletcher, kindly made available the first two grammes of streptomycin.

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A CASE OF SCHÖNLEIN'S PURPURA.

By D. DAVIDSON,

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SCHÖNLEIN'S PURPURA is seldom encountered in such severity as in the case here described; because of this and because of the problem in differential diagnosis it presented, the case was deemed worthy of record.

Clinical Record.

A very ill-looking lad, aged nineteen years, was admitted to the Royal Prince Alfred Hospital on July 18, 1947, complaining of swelling of the joints of his upper and lower limbs of four days' duration. He had apparently been well till July 4, two weeks before his admission to hospital, when he noticed a sore throat; however, this passed away after two or three days. He was well again until July 14, four days before the date of examination, when he felt unable to walk because of swelling and pain in his right leg, particularly in the vicinity of the knee joint. He consulted his local doctor and sulphonamide tablets were prescribed, sixteen of which he took; but the next day the articular swelling and pain involved both lower limbs, both wrists and both elbows, and he also noticed a purplish-coloured rash on his legs and on the lower part of his abdomen. Rheumatic fever at the age of fourteen years was his only significant previous illness. No relevant family history was elicited. The patient lived in a congested city area.

On examination, it was found that the patient's knees, ankles, elbows and wrists were swollen, but not very red or hot. However, the surrounding tissues were oedematous and pitted on pressure. Pain was intense on the slightest movement. The purpuric rash consisted of purplish, blotchy macules varying in size from one-quarter to one-half centimetre in diameter and not fading on pressure. In the centre of some macules there was a darker coloured spot. The rash was most pronounced on the legs, the thighs, the buttocks and the posterior aspects of both arms. Slight epistaxis was present and the fauces were reddened. The conjunctivae were oedematous. No other abnormality was detected in any system.

On the following day (July 19) the patient complained of a sore throat and a cough. In the lower limbs the oedema extended beyond the periarticular tissues to involve the whole of the soft tissues of the calf, foot and thigh. These parts now appeared redder and hotter, and two to three times their normal size. The intense oedema obscured the purpuric rash, but blebs containing serous material were observed in the centre of a number of macules on the

dorsum of the feet and on the lower anterior portion of the legs.

By July 25 the swelling, pain and rash had disappeared from the upper limbs, but the continually changing picture of gross swelling, pain and bleb formation remained in the lower limbs for six weeks.

On the eighth day (July 26) skin excoriation occurred in the sacral area, and punched-out areas were also noted around the scrotum and penis.

The legs and thighs remained in this painful, swollen condition, giving the appearance of an extensive cellulitis or deep-seated thrombosis, and on the twentieth day after the patient's admission to hospital (August 7) the right buttock also became swollen and red. By the twenty-fourth day (August 11) the swelling had extended to the left buttock.

On the twenty-fifth day (August 12) the legs felt softer and were less reddened; but pitting oedema was readily detected up to the groins.

On the twenty-ninth day (August 16) the left leg appeared much improved, but the right leg was very oedematous, particularly around the ankle.

By the thirty-first day (August 18) the blebs, which had progressed to blisters, had reached their maximum size; but smaller blebs were forming, commencing in the centre of purpuric macule. The left leg was now normal in size, but the right leg was even more painful and red than it had been up till then.

By the thirty-eighth day (August 25) both legs had reached an almost normal size.

Bed sores appeared over both great trochanters and sacral regions, and a raw area on the dorsum of the right foot proved refractory to treatment.

Three months later (November 20), when the patient was given six grammes of sulphadiazine as a prophylactic measure before his bed sores were grafted, he vomited and became cyanotic, and his eyelids and lips seemed swollen. The reaction quickly subsided.

Four and a half months after his admission to hospital (January 10, 1948) the patient was allowed up. Considerable swelling of his feet occurred, with bleb formation.

Five months after his admission (January 28) he was discharged from hospital; but when he was reexamined in subsequent months, it was noted that, although symptom-free, he still had oedema of the feet and ankles, and chronic superficial ulceration of the dorsum of the feet. There was also a slight but transient recurrence of the surface rash on the feet at this time.

Investigations During the Illness.

During the patient's illness his temperature ranged from 99° to 101° F., swinging daily, and did not respond to massive doses of penicillin. The pulse rate remained in the vicinity of 100 per minute. The blood pressure was 150 millimetres of mercury (maximum) and 90 millimetres (minimum). No abnormal constituents were detected in the urine. In a throat swab scanty pneumococci, *Strepto-*



FIGURE I.

Showing oedema of lower half of left leg more marked than on the right side.



FIGURE II.

Showing oedema of soft tissues, particularly of the left calf.

coccus viridans and *Hæmophilus influenzae* were found. No abnormal constituents were detected in the faeces. The Wassermann test produced no reaction, the response to the gonococcal complement fixation test was negative, and the Frei test produced a negative result. Dark-ground illumination of smears from the ulcers on the penis revealed no *Spirochæta pallida*. No abnormalities were detected on X-ray examination of the chest and of the bones of the limbs. Gastroscopic examination revealed no abnormalities. Five attempts at blood cultures were made and no growth was obtained. No abnormalities were detected in an electrocardiogram.

Blood counts gave the following information. The haemoglobin value ranged from 70% to 88%. The leucocytes numbered 13,000 to 30,000 per cubic millimetre. The erythrocytes numbered 5,000,000 per cubic millimetre. The number of platelets, the bleeding time, the coagulation time, clot retraction and the prothrombin time were all essentially normal. The blood sedimentation rate was seven to sixteen millimetres per hour (capillary method). The Widal test produced negative results in all dilutions against *Bacillus typhosus* O and H, *Bacillus paratyphosus* A.D.H., *Bacillus paratyphosus* B, *Bacillus paratyphosus* C, *Bacillus proteus* OXK and OX19 and *Brucella abortus*. The blood protein content was 6.7 to 8.0 grammes per centum and the blood urea content was 40 milligrammes per centum. No bilirubin was detected in the serum. The fluid from the bleb contained 3.2 milligrammes per centum of protein and yielded no growth of organisms on attempted culture. Lumbar puncture produced clear fluid under a pressure of 210 centimetres of cerebro-spinal fluid, and the response to the Queckenstedt test was positive. There was no increase in the number of leucocytes in the cerebro-spinal fluid; the chloride content was 720 milligrammes per centum, the protein content was less than 20 milligrammes per centum and the Lange gold curve was represented by the figures 111000000.

Discussion.

Various entities were considered in the differential diagnosis, some of which were as follows.

1. Allergy due to any known cause was considered, particularly the sulphonamide in this case. However, this condition was ruled out because of the great toxæmia caused by the disease, its persistent character and its lack of response to any of the anti-histamine drugs.

2. Meningococcal septicæmia was considered and treatment with massive doses of penicillin was instituted immediately, without, however, any effect on either the temperature or the clinical course of the disease. Several attempts at culture of microorganisms from the blood were made at various phases of the temperature graph, but no organisms could be isolated.

3. Deep-seated thrombosis extending to involve the external iliac veins was considered because of the gross oedema of the limbs. However, the changing character of the swelling and the accompanying toxæmia and pain were not in keeping with the diagnosis. The coagulation time remained above six minutes throughout, although fibrinogen B estimations constantly gave results over "++".

4. Osteomyelitis was considered, only to be ruled out on X-ray evidence.

5. Extensive erysipelas causing pain, redness and swelling was a possibility. A secondary infection complicating a thrombosis was another condition to be taken into account. However, penicillin treatment would have been expected to alleviate the condition. This was not the case, and the disease progressed in its changing character till it subsided spontaneously six weeks after its onset.

All these were ruled out, and the diagnosis of Schölein's purpura was made.

Summary.

The following are the significant features of the case: (i) gross swelling of joints and limbs, particularly the lower limbs; (ii) a purpuric rash, mainly confined to the lower portion of the body; (iii) pyrexia unresponsive to

massive doses of penicillin; (iv) sudden clearance of symptoms and signs at the end of six weeks; (v) the likelihood of recurrences.

A CASE OF RECURRENT DUODENAL OBSTRUCTION.

By FRANKLIN J. GRAY,
Newcastle.

CHRONIC or recurrent duodenal obstruction is a condition of considerable rarity. It has been stated (Partipilo and Wiltrakis, 1942) that, of the numerous possible causes of duodenal obstruction, pressure on the duodenum in a backward direction by the superior mesenteric vessels is by far the most common. The following case record is illustrative of this type of obstruction, with the additional obstructive factor of volvulus of the small intestine due to congenital absence of the root of the mesentery.

Clinical Record.

Miss A.P., aged fifteen and a half years, presented with a history of vomiting attacks since birth. At the age of five days a Rammstedt operation had been performed, but vomiting had continued for three weeks after this. Attacks of vomiting had occurred thereafter at the age of six months, three years, six years, ten years, thirteen years,



FIGURE I.

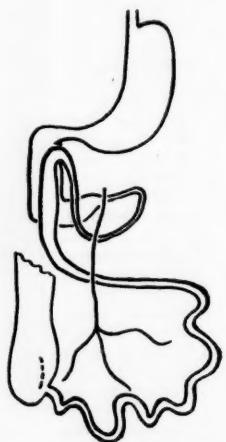


FIGURE II.

fourteen and a half years and fifteen years. The vomiting was profuse, lasting about two weeks on each occasion and necessitating the continuous parenteral administration of fluids. The attacks had always been accompanied by dehydration and ketosis. The vomitus was always "bilious". Pain, severe and colicky in nature and epigastric or periumbilical in distribution, was a feature of the earlier attacks, but had been completely absent from the last five attacks. Barium meal examinations (on four occasions) had revealed no abnormality, and laboratory investigations were of no help in establishing the diagnosis. The case was variously labelled "cyclical vomiting", "acidosis" et cetera.

In May, 1948, an attack of vomiting occurred and lasted for about ten days. On this occasion the customary dry skin, sunken eyes and scaphoid abdomen were evident, but in addition splashing was detected just above and to the right of the umbilicus. This fact, in conjunction with the information that the vomitus contained large quantities of bile, suggested the possibility of an obstruction distal to the pylorus, and perhaps in the terminal portion of the duodenum or the upper part of the jejunum. With this in mind an opaque meal examination was requested during

the attack. The report on this barium meal examination was as follows:

The stomach is large, but not abnormally so. Pylorus and first part of duodenum showed no abnormality and rate of stomach emptying was normal. The second and third parts of the duodenum appear rather larger in diameter than is usual. No evidence of abnormality in the remainder of the small intestine.

In view of the assembled facts a diagnosis of recurrent duodenal obstruction was made, probably due to pressure from the superior mesenteric vessels. It was decided to confirm this diagnosis if possible by posturing the patient in such a way as to relieve the "drag" on the superior mesenteric vessels.

On July 31 the next attack commenced. Both the knee-chest position and the right lateral position with elevation of the foot of the bed failed to relieve the copious vomiting.

Operation was decided upon, and on August 2, 1948, after preparation by means of the intravenous administration of fluids and gastric suction, laparotomy was performed under general anaesthesia (nitrous oxide, oxygen, cyclopropane and curare).

Operation.

The findings at operation (see Figure I) were as follows. The stomach was normal. The second and third parts of the duodenum were dilated to a diameter of about two inches, and thin-walled. The remainder of the duodenum—that is, to the left of the superior mesenteric vessels—and the proximal three inches of the jejunum were narrowed, having a diameter of about half an inch. Congenital absence of the root of the mesentery was revealed, the superior mesenteric vessels entering as by a pedicle. Volvulus of the small intestine and of the proximal half of the ascending colon, through 180°, anti-clockwise, was found. Enlarged, pale lymph glands and dilated veins were present in the mesentery, some of the veins being as large as half an inch in diameter.

The volvulus was untwisted, the proximal portion of the jejunum was carried across to the right behind the pedicle, and a vertical, isoperistaltic anastomosis was performed between the second part of the duodenum and the jejunum, with the formation of a stoma some three inches in length (Figure II).

The post-operative course was uncomplicated; no vomiting occurred, and the patient was discharged from hospital on the tenth day after operation.

Discussion.

The solution to this long-standing problem would appear to be, firstly, the demonstration of splashing over the site of the dilated duodenum, and secondly, the successful performance of a barium meal examination during one of the attacks—that is, before the temporary obstruction had subsided, allowing the duodenum to assume its normal calibre once more. Doubt was thrown upon the pre-operative diagnosis of arterio-mesenteric obstruction when the vomiting was unrelieved by posture.¹ At operation dilatation of the duodenum to the right, and collapse to the left of the superior mesenteric vessels, indicated that this supposition was correct. The nature of the volvulus added a further factor—namely, kinking at the duodenal-jejunal flexure. The presence of enlarged, firm, pale glands and dilated veins in the mesentery suggested that the volvulus was of a chronic nature. It is anticipated that the manner in which the anastomosis was performed will not only provide permanent relief from obstruction, but also prevent recurrence of the volvulus, by anchoring the proximal portion of the jejunum.

Up to the date of publication of the case record the patient has remained in excellent health, except for an attack of infectious hepatitis of some ten days' duration, which occurred ten weeks after operation. The patient had been given serum intravenously after operation, and the opinion expressed by the Red Cross Transfusion Service was that this complication was probably homologous serum jaundice.

Reference.

¹ A. V. Partipilo and G. A. Wiltrakis: "Duodenal Obstruction", *Surgery*, Volume XI, 1942, page 557.

Reviews.

THE HORIZONS OF PUBLIC HEALTH.

"SOCIAL medicine has many links with clinical medicine, and the interplay of clinical work, statistical studies and organized public health has an integrating value, which should foster a mutual interest among the exponents of each of these fields of medical activity."

"How these exponents will ultimately stand to one another is on the knees of the gods, but it seems likely that, as social medicine extends the range of its usefulness, its major exponents will emerge as the practising doctor, the survey specialist and the medical officer of health. The most important, because the most clinical, will be the practising doctor."

The quotation is from "A Manual of Public Health: Hygiene", by Professor J. R. Currie and Dr. A. G. Mearns.¹ Discussing social medicine under the general heading "The Social Vista", the writers review the Goodenough Committee's report, especially referring to the portion dealing with the medical curriculum in relation to public health. It is one of the best chapters in the book. In it they also give a very useful and concise history of the development of social medicine in England over the past four centuries. Such a description, especially if read in conjunction with a general historical treatise—Trevelyan's "English Social History" for instance—is very illuminating. In the concluding portion of the chapter they deal with the *National Health Service Act* of 1946, which came into operation in July, 1948.

This text-book of public health has grown surprisingly since its first edition some ten years ago. In the second edition of 1945 and in the third edition Professor Currie has had the assistance of Dr. Mearns, senior lecturer of public health in the University of Glasgow. The original text-book was of 308 pages, and was illustrated by 34 figures. The present book is just over 700 pages, and there are 212 illustrations and four plates in colour. But mere growth is not always an advantage. Sometimes excuses have to be made for the enlargement of medical text-books. The present writers, however, need offer no excuses. The subject of public health has continued to grow since the time of the first edition. In England at any rate every practitioner must know something of the official organization of medical practice in some of its aspects. The authors refer to Professor John Ryle's first annual report on the Oxford Institute of Social Medicine. They quote:

Social medicine is a comprehensive term. It may, in fact, be held to include the whole of the public and industrial health services, the social services and the remedial services of a community. But just as clinical medicine may be considered not only in terms of medical practice, but also as an academic discipline, so too may social medicine be considered. . . . Human pathology is the related science of clinical medicine. Social pathology is the related science of social medicine.

Commenting, the authors write:

The practitioner who aspires to serve under the *labarum* of social medicine, so convincingly set forth by Professor Ryle, will, while continuing to function as a skilled clinician, find his professional outlook widened by new horizons.

In its 26 chapters the text-book presents a comprehensive review of modern public health and preventive medicine. And the review is sound and balanced. The Australian student may not be greatly interested in details of the legal enactments and administrative arrangements in England and Scotland—and the book gives a clear description of the main features there—but he will find the bulk of the book, dealing with general features appropriate for any country, full of valuable information.

Of particular interest are the chapters on inheritance, industrial hygiene, statistics, infection, infestation, and health education. For a book on general public health these items certainly are well covered. The chapter on inheritance sets out some of the basic features; it briefly reviews the topic of eugenics. The hazards of industry and the basic aspects of statistics appropriate to public health

¹ "Manual of Public Health: Hygiene", by J. R. Currie, M.A. (Oxon), M.D., LL.D. (Glas.), D.P.H. (Bir.), F.R.C.P. (Edin.), and A. G. Mearns, M.D., B.Sc. (Public Health), D.P.H. (Glas.), F.R.S. (Edin.); Third Edition; 1948. Edinburgh: E. and S. Livingstone, Limited. 8½" x 5½", pp. 746, with illustrations. Price: 35s.

work are two well-treated features. The chapter on infestation gives a comprehensive outline of the animal parasites and is a veritable study *in parvo* on medical zoology.

In public health work today the cooperation of the people, rather than their control by law, seems a line of action most likely to give good results. How to interest people in their own health, yet not to set up baseless fears—that is the difficulty arising so often. Few text-books on public health have much to say on this matter of health education. Here, however, is a good summary of suitable methods. With the increasing development of official medical services, the call for useful health education throughout the community is insistent and clear.

Within the limits prescribed by its authors this book of Currie and Mearns is a sound guide. It is concise, coherent and readable. It is a carefully assembled book and not a mere set of scrappy notes.

A PHARMACOPEIA OF PROPRIETARY DRUGS.

THE exact scope and purpose of H. D. Jackson's "Pharmacopoeia of Proprietary Drugs, 1948" are not quite clear. There is no introductory or explanatory note or even subtitle to guide the reader, and study of the text does not help a great deal. The book, which is an Australian publication, consists of a list of proprietary preparations arranged in alphabetical order; under the name of each preparation are given a brief statement of its chemical or pharmaceutical nature, a summary of its use, its dosage and details of the firm which packs it and the standard amounts in which it is packed. These are printed in quite pleasing type and are well set out so that reference is easy. The list of preparations is not, however, comprehensive and one wonders what was the basis of selection. Absence of information on this detracts from the book's value for reference purposes, as does the regrettably large number of misspelt names; for example, "Antistin" and pyridoxin are spelt with a final "e", but it is omitted from "Metycaine"; carbarsone is spelt as "carbasone", "Zephiran" as "Zepheran" and "Solganal" as "Solganol"; in one place "Progynon B Oleosum Forte" is spelt without the final "e" and in another it appears as "Progynon B Forte oleosum". The omission of a comma in the list of trade names of Mersalylum B.P. makes it appear that "Mergurcan Salyrgan" is a single name. The use of capital letters in the text in the naming of preparations, diseases and organisms is not even consistent. We regret having to make these comments as the author's idea is a good one and this publication could be a very useful little reference book if its scope was defined and its errors were corrected. Even as it is it should be useful to many, but we hope that a second (amended) edition will appear soon.

PARENTCRAFT.

A "HANDBOOK OF PARENTCRAFT", by Dr. Leslie Housden, O.B.E., is the fifth book published by this writer on various aspects of child-rearing and home-making.¹ The present volume is small, covering only 147 pages, but a remarkable amount of information and advice has been crammed into this space.

The discussion of the conditions necessary for good physical growth and healthy functioning of the body should make absorbing reading for any prospective or actual parents and should enable them to have an intelligent understanding of the fundamental rules of health.

Dr. Housden is a sound psychologist as well as an experienced physician, and although mental growth and aspects of personality development are dealt with only very briefly, his conclusions are soundly based.

These general principles of bodily growth and personal behaviour hold good for children in any part of the world, but when the writer gives more particular and precise instructions for the daily care of the child, a great difference between English and Australian practice will be noted. Australian mothers would do much better to be guided by local authorities in matters of daily care and feeding. The social services mentioned also have no relation to our conditions, but make an interesting comparison between services for mothers and babies both here and overseas.

¹ "Pharmacopoeia of Proprietary Drugs, 1948", by H. D. Jackson, M.M., M.P.S., Ph.C.; 1948. Sydney: Grahame Book Company. 7" x 4", pp. 61.

² "Handbook of Parentcraft", by Leslie George Housden, O.B.E., M.D.; 1948. London: Eyre and Spottiswoode. 7" x 4", pp. 152. Price: 5s.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"Plaster of Paris Technic", by Edwin O. Geckeler, M.D.; Second Edition; 1948. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson, Limited. 9" x 6", pp. 240, with 236 illustrations. Price: 22s. 6d.

A detailed account of methods of using plaster of Paris in surgery.

"Planning Your Exhibit", by Janet Lane and Beatrice K. Toileris; 1948. New York: National Publicity Council for Health and Welfare Services, Incorporated. 10 1/2" x 7 1/2", pp. 32, with illustrations. Price: \$1.00.

A practical account of the planning of exhibits on medical or social welfare subjects.

"Artificial Pneumothorax in Pulmonary Tuberculosis", by G. M. Heaton, M.B. (Toronto), with an Introduction by Dr. C. D. Parfitt; Second Edition; 1947. Toronto: The Macmillan Company of Canada, Limited. 8" x 5 1/2", pp. 312. Price: 20s.

An attempt to summarize and evaluate the hitherto scattered literature on pneumothorax.

"Marriage Counselling: The First Full Account of the Remedial Work of the Marriage Guidance Councils", by David R. Mace, M.A., B.Sc., Ph.D., with a foreword by the Rt. Hon. Henry Willink, M.C., K.C.; 1948. London: J. and A. Churchill, Limited. 7 1/2" x 5 1/2", pp. 184. Price: 8s.

The result of five years' experience since the setting up of the first marriage guidance centre.

"An Introduction to Gastro-Enterology", by Walter C. Alvarez; Fourth Edition, revised and enlarged; 1948. New York: Paul B. Hoeber, Incorporated. 10" x 7", pp. 932, with 186 illustrations. Price: \$12.50.

A comprehensive account of gastro-intestinal function and the methods of its investigation with an exhaustive bibliography.

"The Premature Baby", by V. Mary Crosse, O.B.E., M.D. (London), D.P.H., M.M.S.A., D. (Obstet.) R.C.O.G., with a foreword by Sir Leonard G. Parsons, M.D., F.R.C.P., F.R.C.O.G., F.R.S.; Second Edition; 1949. London: J. and A. Churchill, Limited. 8" x 5", pp. 182, with fourteen illustrations. Price: 12s. 6d.

A complete revision of this account of the management of the premature baby.

"Atlas of Neuropathology", by Wm. Blackwood, M.B., F.R.C.S.E., T. C. Dodds, F.I.M.L.T., F.I.B.E., F.R.P.S., and J. C. Sommerville, A.I.M.L.T., with a foreword by Professor A. Murray Drennan, M.D., F.R.C.P.E., F.R.S.E.; 1949. Edinburgh: E. and S. Livingstone, Limited. 9 1/2" x 7", pp. 216, with 262 illustrations, some of them coloured. Price: 35s.

A presentation of the most important pathological conditions for those beginning the study of neuropathology.

"Clinical Chemistry in Practical Medicine", by C. P. Stewart, M.Sc. (Dunelm.), Ph.D. (Edin.), and D. M. Dunlop, B.A. (Oxon.), M.D., F.R.C.P. (Edin.), F.R.C.P. (London); Third Edition; 1949. Edinburgh: E. and S. Livingstone, Limited. 8 1/2" x 5", pp. 336, with 30 illustrations. Price: 17s. 6d.

A general account of methods of biochemical investigation with details of the simpler tests for the practitioner, house physician and senior student.

"Elementary Anesthesia", by W. N. Kemp, M.D.C.M.; 1948. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson. 9" x 5", pp. 310, with 100 illustrations. Price: 37s. 6d.

Deals with common practices in the administration of general and regional anesthesia for the undergraduate and general practitioner.

"Blood Clotting and Allied Problems: Transactions of the First Conference, February 16-17, 1948, New York", edited by Joseph E. Flynn. New York: Josiah Macy, Junior, Foundation. 9" x 6", pp. 180, with illustrations. Price: \$3.25.

A report of a conference on blood clotting and allied problems including the exact techniques for prothrombin determination as used in the several laboratories represented.

"The 1948 Year Book of General Medicine", edited by Paul B. Beeson, M.D., J. Burns Amberson, M.D., George R. Minot, M.D., F.R.C.P. (Edinburgh and London), William B. Castle, M.D., S.M., M.D. (Hon.), Utrecht, Tinsley R. Harrison, M.D., and George B. Eusterman, M.D.; 1948. Chicago: The Year Book Publishers, Incorporated. 7" x 4 1/2", pp. 826, with 155 illustrations. Price: \$4.50.

A survey of the literature on general medicine published during the year up to July, 1948.

The Medical Journal of Australia

SATURDAY, FEBRUARY 19, 1949.

All articles submitted for publication in this journal should be typed with double or triple spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

MECHANOLATRY.

WHEN Dr. Aage Gilberg, of Copenhagen, spent a year of medical service with the still unsophisticated Eskimos of northern Greenland, he found amongst this primitive people a high incidence of tuberculosis. The diagnosis was made partly by the usual signs and symptoms, but chiefly by the detection of the tubercle bacillus in the sputum, for Dr. Gilberg had taken with him his microscope and the requisites for staining technique. Then one day, as we are told in his delightful "Eskimo Doctor", he was visited by a Canadian medical man who asked whether X-ray photographs of the patients had been taken. On hearing that these could not be made, the Canadian visitor informed Dr. Gilberg that he could not accept a diagnosis in the absence of such evidence. We refuse to regard this critic as a normal product of a Canadian university, but we can unfortunately recognize in him a type which any modern medical school is only too apt to produce. Each new diagnostic procedure is usually acclaimed beyond its merits until "the explosive power of a new affection" comes into play, and this is especially the case when an instrument of precision, or seeming precision, is employed. The medical student cannot be told too often that the evidence derived from instrumental sources must always be subsidiary to the assembled clinical and pathological totality. Mackenzie's great service was not his invention of the polygraph which is rarely seen today, but his insistence that the circulation as a whole should be considered when the heart is examined for any suspected defect. Doctors of a former generation applauded the sphygmograph and no doubt impressed their patients by its application, but this instrument is now treated rather as a toy in physiological laboratories or museums.

The heart and circulation have been mentioned and this department of medicine can be taken as a type. Stethoscope and percussion did yeoman service and still do, especially the former. Then came the string galvanometer which picks up the changes of electric potential arising from muscular contraction of the several parts of the heart mechanism and giving information about the site of origin of contraction and its conduction concerning which the stethoscope is silent. Refinements of technique in the use

of X rays allow the changing profile of the heart to be demonstrated with ease. Then only a few years ago there came a new instrument, the rheograph, in the application of which high-frequency currents are sent through the thorax and the changes in resistance arising from the altering volume of blood in the heart are recorded and interpreted. Now there arrives on the scene radio-cardiography in which radioactive sodium is injected into a cubital vein and the passage of this "tagged" material to and from the heart is detected and quantitatively recorded by placing a Geiger-Müller counter on the precordium.¹ The record shows two waves, one the entry of the "tagged" sodium into the right side of the heart, a depression indicating the expulsion into the lungs, whilst the second wave marks the entry into the left side of the heart. Not only can circulation time be measured with some degree of accuracy, but from the shape of the graph valuable information can be obtained concerning certain pathological states of the cardiac pump. That this latest technique closes a long chapter in circulatory diagnosis we may dismiss at once as improbable. Methods utterly undreamed of today will assuredly be invented and applied, but not one of them is likely to do more than make just another contribution to the sum of evidential facts acquired by other methods; and whilst each new device is almost certain to create a new order of specialist, the trained vision, hearing and touch of the family doctor will, we may venture to prophesy, remain supreme. It will be his function to decide whether or not his patient should be submitted to any or all of the complicated artifices available, to advise accordingly and to choose the technician he thinks the best for the case; he must possess sufficient knowledge concerning the most modern appliances and procedures to do this, but no more. It has been said of certain medical schools which boast of their extensive instrumental equipment that their average graduate is not so useful when faced with responsibility in conditions which do not allow "press the button" diagnostic or operative procedures, as when acting alone on board ship or in an exploring party or as practitioner in a distant country township. Here he must fall back on those instruments which can be carried or installed. The Canadian described by Dr. Gilberg, though very probably an admirable consultant in a metropolitan city, would cut a poor figure as a flying doctor in Australia, or indeed had he changed places with the Danish practitioner, in arctic Greenland.

There is, however, a grave danger threatened by mechanolatry, and that is omission to regard the patient as a human being with human emotions, hopes, fears, frustrations, worries, temptations and day-dreams and living in an environment beset with fellow human beings. The greatest attribute of the family doctor is that in truth he does know the family, and facts which may appear to a certain type of consultant as small or imponderable have a way of integrating into dominant significance. That a diagnostic team of specialists will ever gain the affection as well as the confidence of the patient in the same way as the good type of family physician, we may well doubt. By all means let every advance of physical and biological science be directed to the pursuit of medicine and surgery; let there be no hesitation in investigating every possible medical application of every new discovery in the realm

¹ *Science*, September 24, 1948, page 340.

of experimental investigation; but the physician and surgeon should never forget that a patient is not like a geological specimen which can yield all its secrets of composition, origin, history and relations with its environment by methods of inquiry which do not include the study of the myriad complexities of human nature.

Current Comment.

MORTALITY AMONGST MEDICAL SPECIALISTS.

THE investigation of the mortality rates of groups is not always very helpful or comforting to individuals of the groups who seek to gaze into their own personal crystal bowls, but it can provide useful information. L. I. Dublin and M. Spiegelman have investigated the mortality rates of specialist medical practitioners, first comparing them with those of general practitioners and then considering what differences in mortality there may be among the several specialties. Only those devoting full time to their specialties were classed as specialists. As a basis of comparison of mortality of specialists and non-specialists, and also among the several specialties, the death rates according to age and cause of death for all male practitioners from an earlier study made by Dublin and Spiegelman¹ were taken as the standard. For each specialty the ratio was formed of the actual deaths from a specific cause to the number that specialty would have experienced if it had been subject to the death rates of the standard thus chosen; the ratio was referred to as the mortality ratio. The results of such a computation for all specialties combined were compared with the corresponding results for non-specialists. The investigation was confined to those (both specialists and non-specialists) who were between the ages of thirty-five and seventy-four years, as the greatest concentration of specialists occurs amongst those in this age group and it was felt that specialists aged less than thirty-five years had not been exposed long enough to manifest the effects of any hazards that might be involved in the practice of a specialty. Perhaps the most striking finding of the investigation is the general one that the mortality rate of specialists, as a group, is only 70% of that of non-specialists, and, although there are decided variations within the specialist group, the members of each individual specialty appeared to fare better than the non-specialists. The pathologists were in the most favourable position, having a mortality rate less than three-fifths of that of non-specialists. At the other extreme were those specializing in dermatology and tuberculosis, but even their mortality rate was only nine-tenths of that of the non-specialists. Dublin and Spiegelman suggest that this lower mortality may arise from the self selection on the part of healthier doctors to continue their studies, from higher income levels, from more favourable conditions of work and from opportunities for better medical care. They then go on to consider the mortality ratios in relation to individual diseases. For almost all of the specialists, the mortality ratios for the cardio-vascular and renal group of diseases are not much different from the corresponding ratios for all causes of death. The same high level of mortality from the diseases of the coronary arteries and *angina pectoris* runs through practically all classes of specialists and the non-specialists; only physicians and paediatricians have a mortality rate from these conditions that is significantly lower than the average for all doctors. The rate of mortality from cancer among general surgeons is well below the record for members of any other specialty and also for non-specialists; this may be due, it is suggested, to their training in early recognition of the condition and their knowledge of the benefit of early treatment. On the

other hand, radiologists, radiotherapists and dermatologists have a high rate of mortality from cancer and leucemia, far above that for non-specialists; if this fact is significant, and it appears to be so, it is difficult to suggest any other reason than that put forward by Dublin and Spiegelman—that it is the effect of their exposure to dangerous radiations. Specialists, as a group, have a much lower rate of mortality than non-specialists from the diseases of the respiratory tract and from infectious conditions, such as tuberculosis, pneumonia, influenza and syphilis. The specialists also fare comparatively better than non-specialists in their rate of mortality from ulcer of the stomach or duodenum, hernia and intestinal obstruction, cirrhosis of the liver, appendicitis and diseases of the gall-bladder. Suicide, automobile accident fatalities, as well as fatalities from other types of accident, are relatively fewer among specialists than among non-specialists. Altogether in America specialists appear to be in a much happier position than non-specialists from the point of view of survival and, although opinions as to the reason for this can be little more than speculative, it seems reasonable to assume that the position would be comparable in Australia. It is unlikely that this revelation will materially influence the decision of an individual whose heart is set on a specialty or on general practice.

TESTS OF THE BLOOD AND PATERNITY PROCEEDINGS.

THE recent litigation in Victoria to determine who were the true parents in a case in which, it was alleged, two babies were severally given to the wrong mother, has raised again, in unusually dramatic circumstances, the question of the importance of blood tests in the field of forensic medicine.

In New South Wales the matter received the attention of the legislature when the *Child Welfare Act* was amended in 1939. "Blood test" is there defined as a test made for the purpose of ascertaining the inheritable characteristics of blood. The new section then provides in detail for a scheme for directing and carrying out blood tests and the use of such tests as evidence in affiliation proceedings. A children's court consisting of a special magistrate shall, at the request of a person against whom an order for maintenance has been made or of the parties to any affiliation proceedings, direct that the child, the mother and the alleged father submit to blood tests. Such direction shall nominate a medical practitioner to take blood samples and a pathologist to make the blood tests. The pathologist so nominated shall be a medical practitioner whose name is on a panel of names authorized to carry out blood tests under this section, which panel shall be prepared by the Minister on the recommendation of the Director-General of Public Health. Where a direction for a blood test has been given, the mother and child must within the time prescribed attend the medical practitioner nominated to permit him to take blood samples, and their failure to do so will result in the complaint being dismissed or an order for expenses of maintenance being discharged as the case may be. The medical practitioner is bound to forward blood samples to the pathologist, who is bound to make the tests and to embody the results in a prescribed form of certificate. Such certificate shall be evidence of the facts and conclusions stated therein.

The section of the Act is to commence on a day to be appointed, but so far it is still in abeyance. Mr. Justice Bonney commenting on this in the case of Hobson v. Hobson (decided in 1942 and reported in 59 Weekly Notes) said: "Presumably it has not yet been found possible to prepare a panel of authorized pathologists under sub-s 3 (8) to carry out such tests; the lack of any Australian laboratory for the preparation of the necessary Anti M and Anti N serums is no doubt another serious obstacle."

This judgement of Mr. Justice Bonney is of the greatest importance and provides an interesting illustration of the application of blood tests. The husband, the petitioner in a suit for dissolution of marriage on the grounds of his wife's adultery, alleged that his wife had a child of which

¹ The *Journal of the American Medical Association*, August 21, 1948.

² The *Journal of the American Medical Association*, August 9, 1947.

he was not the father. The petitioner founded his case on evidence considered under four heads. The first three were previous association between the respondent and the co-respondent, remarks made by the co-respondent and a sworn admission of adultery by him, whilst the fourth was scientific evidence founded on blood tests. The only evidence of significance was the last mentioned and this became the crux of the case.

Tests carried out under the ABO system showed that neither the petitioner nor the co-respondent could be excluded as a possible father of the child, but tests under the MN system showed that the petitioner could not have been the father of the child and therefore the respondent had committed adultery with someone. It was held first that the evidence of the conduct of the blood tests and their result was admissible on the issue of adultery, secondly that the Court was warranted in accepting this evidence as sufficient proof that the petitioner was not the father and accordingly that the respondent had committed adultery, and thirdly, that evidence as to the results of the tests indicating that the co-respondent could not be excluded as the possible father of the child and was merely a "compatible" parent, was wholly insufficient to establish the adultery charged against the co-respondent. Before arriving at these conclusions Mr. Justice Bonney considered with the greatest of care the scientific basis of blood tests and the conditions under which they are to be performed before absolute reliance can be placed on the results.

This judgement is a contribution to medico-legal literature of such importance that it should be read by the members of both professions. It is described as "comprehensive and monumental" by Sidney B. Schatkin in the second edition of his book "Disputed Paternity Proceedings". Mr. Schatkin is Assistant Corporation Counsel of the City of New York. His book¹ is the result of rich practical experience, thoroughness in research and scholarship within his specialized field.

The book first appeared in 1943, but within five years the author found it necessary to produce a second edition. He makes the following statement:

During the years 1944-1946 blood tests developed at an accelerated pace. Whereas in 1943 an incorrectly accused man had one chance in three to obtain an exclusion, he now has better than an even chance; in fact, the chances are now as high as 55%. This added opportunity is due to the Rh blood factor, the discovery of which was announced by Landsteiner and Wiener in 1940, and, after the death of Landsteiner in 1943, was developed by Wiener, Levine and others to a point where as high as 55% of the incorrectly accused men could be exonerated. The development of Rh has raised to 360 the total number of blood type combinations that can be separately distinguished. The importance, therefore, of the blood factor Rh (the test is properly called the Rh-Hr test) cannot be overrated.

The author cannot cease marvelling at the unerring accuracy of blood tests, and he states, without any mental reservation, that a competently and conscientiously performed blood test is infallible proof of non-paternity.

A special effort is made in this volume to give additional proof of the accuracy and infallibility of blood tests. Many case histories are furnished of exclusions invariably followed by confessions. The author has tried to convince even the most sceptical of the complete reliability of the test.

Much of the work is of value only to a lawyer practising within the United States. Five of the chapters, however, are of universal interest and, although they are contained in little more than 100 pages, they provide a valuable compendium of information for both medical practitioners and lawyers. Every important proposition is supported by authority and the elaborate footnotes may be said to constitute an index to the literature of the subjects dis-

cussed. The chapters referred to are: "The Scientific Aspects of Blood Tests", "The Rh-Hr Blood Types" (in which two tables are included, analysing firstly the eight Rh blood types in disputed parentage and secondly the additional exclusions of parentage possible with the aid of standard Anti-Hr sera), "The Legal Aspects of Blood Tests" (in which the author presents an excellent summary of the medico-legal position in the more important countries), "Blood Tests—An Effective Rebuttal of the Presumption of Legitimacy" and "The Unerring Accuracy of Blood Tests". Though practitioners of medicine will not have many opportunities to investigate disputed paternity, it is important that they should understand what examination of the blood can reveal, for they may be asked about it at any time in the consulting room.

EMBALMING.

EMBALMING is not a common practice in this country and probably many people think of it only as a rather mystic custom of the ancient Egyptians. It will certainly surprise most people to know that the number of subjects prepared for burial by the process of embalming has increased in Great Britain from almost zero to approximately one-fifth of the death rate in the past fifteen years. G. S. Lear,² who supplies this information, points out the advantages of the practice: first as a hygienic method of dealing with a body awaiting disposal, especially if delay is necessary or anticipated, and then in its psychological effect on the bereaved and the simplification made possible in the funeral arrangements. The embalmer is concerned with appearance equally as much as with sterilization and the technique includes "closing of the eyes and mouth, hair-dressing, shaving, positioning, dressing and make-up". One result is that the deceased person can be left as though peacefully sleeping in bed until the actual time of the funeral, with the resultant avoidance of "all the gruesome accoutrements of the death chamber". An obvious instance of the value of embalming is a death at sea in which it is desired for any reason to bring the body home for disposal. There are also indications in the medico-legal field. Lear quotes a rather gruesome incident in which embalming helped to meet a difficult situation: during the war so many patients died from influenza in a London hospital that the bodies could not be accommodated in the mortuary, and during the night rodents came into the mortuary and disfigured the faces of many of the bodies; to avoid distress on the part of relatives, the bodies were embalmed, and then by means of "derma surgery" it was possible to rebuild the damaged tissues so that no evidence of disfigurement could be observed.

The process of embalming is, in broad terms, the complete irrigation of the vascular system by a disinfecting solution injected into one or more of the main arteries, the blood being simultaneously drained from one or more of the main veins. The solution is basically one of formalin, glycerin and borax with colouring matter to restore the natural complexion to the tissues. Its satisfactory distribution removes all traces of cyanosis and hypostasis, according to Lear, and the massage of the exposed parts during the course of the injection results in the complete restoration of the natural contours. Normal or abnormal body fluids are removed by aspiration, and parts and substances not receiving a supply of embalming chemical in the course of the arterial injections, as, for example, faecal matter in the alimentary tract and special diseased areas, are cared for by a direct injection of concentrated embalming chemical. Lear discusses some of the details involved in dealing with particular parts and diseases and also points out the need for cooperation on the part of those conducting post-mortem examinations, both in facilitating the embalmer's operations and in avoiding unnecessary disfigurement of the body. Although the paper does not cover more than basic principles with some detail for illustration, it is apparent that embalming is a highly developed technique. Its value needs no stressing once it is pointed out.

¹"Disputed Paternity Proceedings", by Sidney B. Schatkin; Second Edition; 1947. New York: Matthew Bender and Company Incorporated. 9" x 6", pp. 624.

² *The Practitioner*, August, 1948.

Abstracts from Medical Literature.

SURGERY.

Plastic Surgical Repair of Facial Paralysis.

PAUL W. GREELEY (*Archives of Surgery*, February, 1948) presents a review of the methods which may be used and the results obtained in the treatment of injury of facial nerves. He states that all patients with facial paralysis should receive the benefit of a neurosurgical consultation before a plastic operation is decided upon. Suture of the nerves and the introduction of nerve grafts give the best results in certain selected cases. Nerve substitution or the anastomosis of the distal end of the divided facial nerve to the hypoglossal or spinal accessory nerve is losing its popularity and is not considered desirable because the associated movements in trying to move the face are usually more conspicuous than the original facial paralysis. The simplest and most satisfactory plastic surgical result is obtained by the use of strips of autogenous *fascia lata* as supports. Tantalum wire is not recommended for this purpose. Muscle transplantation procedures, with a sufficiently large pedicle of the masseter or temporal muscle anchored by means of *fascia lata* strips to lengthen the transplant, may produce some activation of the face after it has been supported by fascial strips. The cooperation of the patient in intelligently practising movements before a mirror is necessary to gain motion and facial expression.

Surgical Treatment of Chronic Ulcerative Colitis.

G. W. AULT (*The American Journal of Surgery*, February, 1948), in reviewing the records and ultimate outcome in 110 cases of chronic ulcerative colitis, expresses concern about a group that have been classified as "advanced" cases of chronic ulcerative colitis. He states that in 15% to 20% of all patients with this disease it reaches an advanced stage. This can follow an acute fulminating onset or be a result of recurrent attacks, and these two rather distinct ways of reaching this advanced stage are of great importance, for, in the author's experience, in those cases occurring as a result of an initial fulminating attack the patients fared badly, whilst in those following recurrent attacks the majority of patients survived surgical treatment and were rehabilitated. The indications for surgery are specific and elective. Specific indications for surgery include: chronic ulcerative colitis with constitutional and visceral degenerative changes; ano-rectal complications, such as abscess, stricture and fistula; polyoid degeneration and carcinoma; obstruction and tumour mass; subacute perforation, abscess and fistula. Elective indications for surgery include: focal infection, such as disabling polyarthritis, pyoderma and neuritis; haemorrhage, after supportive or restorative transfusion *et cetera*; acute fulminating ulcerative colitis—not in the actual attack, but after the patient has been carried over the critical stage if he shows signs of returning to a toxic febrile phase; acute perforation,

though in this case surgery is usually futile and this complication with rare exceptions is fatal. The surgical procedures discussed include: ileostomy without colectomy; ileostomy with total colectomy, the rectum being left in; ileostomy with total colectomy—abdomino-perineal resection; ileostomy with right colectomy; left colectomy—abdomino-perineal resection; ileo-sigmoidostomy with total colectomy; segmental resection and anastomosis; colostomy in the presence of inoperable carcinoma. With the use of these procedures for twenty patients selected as suitable for surgical treatment, 70% were restored to health and previous occupation.

Tumours of the Testicle.

H. R. SAUER, E. M. WATSON AND E. M. BURKE (*Surgery, Gynecology and Obstetrics*, May, 1948) draw attention to the cumbersome and at times confusing nomenclatures in relation to the tumours of the testicle. They suggest a simplified classification based on the observations of Friedman and Moore at the Army Institute of Pathology where they were able to study 992 testicular neoplasms. The classification suggested is (i) seminoma, (ii) embryonal carcinoma with choriocarcinoma as a subgroup, (iii) adult teratoma, and (iv) teratocarcinoma or teratoma. The authors describe fully the criteria considered in grouping their cases. With regard to symptomatology they found that in 51.1% of cases the diagnosis was made within six months of onset of symptoms. The time elapsing between onset of symptoms and establishment of diagnosis had no significant effect on the end results. The duration of symptoms was longest in the seminoma group, shortest in the teratocarcinoma group. Enlarged testicle was the most common complaint. Painless swellings were associated more commonly with seminoma, painful swellings with embryonal carcinoma or teratocarcinoma. The authors consider surgery and external irradiation to be the accepted forms of treatment. They have abandoned pre-operative radiotherapy. The surgical treatment recommended is simple orchidectomy, the radical operation being reserved for patients with the more radio-resistant tumours. The end results in this series showed an over-all cure rate of 47.5%, a five-year cure rate of 48.9%, and a ten-year cure rate of 34.7%.

Diverticulitis in the Female.

VIRGIL S. COUNSELLER (*American Journal of Obstetrics and Gynecology*, April, 1948) discusses diverticulitis with particular reference to the disease in women. The reported incidence of diverticulitis in 8500 autopsies is 15%, of which 95% occur in persons forty years of age or older. The production of diverticula is by increased tension in a normal segment of bowel causing herniation at the areas of least resistance where the blood vessels pierce the wall. It is estimated that 10% to 20% of patients with diverticulitis will eventually develop diverticulitis. In this latter group about one in four will require surgical intervention. The diverticula are located in the sigmoid in about 80% of cases and this diverticulitis may involve the adnexa of either one or both sides, and occasionally the urinary bladder. The symptoms are those of an inflammatory process, usually in the

pelvis or in the left lower quadrant of the abdomen. Pain, increase in temperature, and leucocytosis occur, and there may be signs of obstruction, perforation, formation of tubo-ovarian or cul-de-sac abscesses. Sigmoidoscopy may reveal limited mobility of a normally freely movable segment of bowel, angulation of the upper part of the rectum, reduced lumen and adherent mucosal fields, sacculation of the sigmoid colon and even actual visualization of the diverticula. A barium enema may show the characteristic mucosal pattern of inflammation, a perisigmoidal abscess may be outlined, but rarely are sigmoido-vesical fistulae demonstrated. When a female patient has a left adnexal mass which appears a little higher than usual on bimanual examination, a radiogram of the colon may be most helpful. A carcinoma of the colon may be mistaken clinically for a solid tumour of the ovary and at surgical operation it is quite impossible in some instances to determine grossly if the lesion is inflammatory or malignant. Acute pelvic inflammatory disease and acute diverticulitis may be easily confused clinically. Patients who have complications, such as perforation, obstruction and fistula formation, require surgical treatment. Sigmoido-vesical fistula is characterized by dysuria, pyuria, and the passage of faeces and gas *per urethram*. These fistulae never heal spontaneously. A multistage procedure is now agreed to be safest. Colostomy is carried out at some distance proximal to the lesion and is followed weeks or months later by resection of the involved portion of bowel with end-to-end anastomosis. Exteriorization of the involved segment may also be performed. Closure of the colostomy without resection has a rate of recurrence that is too high. The operative mortality rate has been reduced from 14.7% to 4.2% since the introduction of the sulphonamides.

Radical Mastectomy.

HADLEY ATKINS (*The British Journal of Surgery*, July, 1948) describes a method of radical mastectomy incorporating certain modifications which he has evolved in the past ten years. The first modification is the infiltration of the skin with a 1/500,000 solution of adrenaline in normal saline. This infiltration seems to render the dissection of the skin flaps almost bloodless and defines precisely the plane of skin reflection. The second modification consists in leaving the reflection of the medial skin flap to the last stage of the operation. The axilla is dissected first, the intercostal vessels are secured as they emerge, and finally the medial flap is reflected. The author finds that, in half the cases, a split-skin graft is needed to cover the defect remaining in the skin.

Modern Management of Megacolon.

B. M. BOSWORTH, H. D. STEIN AND J. R. LISA (*The American Journal of Surgery*, June, 1948) review the pathology, diagnosis and aetiology of megacolon and give an analysis of the results obtained by methods of treatment advocated by various authors. They state that the treatment of megacolon today is in a state of flux, there being wide divergence of opinion as to what is the best method. The procedures practised are conservative

management, spinal anaesthesia, sympathectomy and colon resection either subtotal or total. Conservative measures including diet of low roughage content, rectal dilatations, colonic flushes, mineral oil, vitamins, mild catharsis and meticulous supervision over a long period should in most cases be given a thorough trial. The administration of parasympathetic stimulants such as mecholyl bromide is recommended by many authorities. Spinal anaesthesia is used as a therapeutic adjuvant to a medical régime and also as a diagnostic test to predetermine the value of sympathectomy. Sympathectomy is recommended by some authorities only in early or moderately advanced cases in which organic changes in the bowel wall are not too great. The danger that bilateral sympathectomy may produce sterility in the male is stressed. Subtotal colonic resection is recommended by many authorities after a thorough medical régime has been tried and failed; they prefer this to sympathectomy, which they believe does not appreciably alter the underlying disorder. Total colonic resection is recommended by Grimson in advanced cases because of the fact that megacolon may reappear in another segment of colon years after a subtotal resection.

Experimental Production of Intrarterial Septal Defect.

ALFRED BLALOCK AND C. ROLLINS HANLON (*Surgery, Gynecology and Obstetrics*, August, 1948) consider that in a number of clinical conditions the establishment of an intrarterial septal defect might act to "balance" the right and left sides of the heart and thereby benefit the patient. In an attempt to develop a technique for this operation, the authors devised an approach under vision, using a special occlusive clamp. The method is based on the anatomical fact that the right superior pulmonary veins are closely adherent to the dorsal wall of the right auricle, which forms one component of the intrarterial septum. The communication between the two sides of the heart is made by excision of the adherent walls of the right auricle and the pulmonary veins. The operation was performed on 31 dogs and the authors conclude that the technique can produce a defect under direct vision, with minimal loss of blood, with fairly accurate control of size and with good prospect of maintained patency. Possible application of this method now awaits further investigation under certain abnormal conditions.

Therapy of Meconium Ileus.

ROBERT B. HIATT AND PAUL E. WILSON (*Surgery, Gynecology and Obstetrics*, September, 1948) give a review of the literature of meconium ileus since 1905, when Landsteiner described for the first time the association between meconium ileus and pancreatic cystic fibrosis. There are all variations and degrees of obstruction due to abnormal meconium in patients with cystic fibrosis of the pancreas. Some have no obstruction at all; some pass transient meconium plugs after mild obstructive symptoms; others again have meconium over almost the entire small bowel. Swenson and Ladd, in 1945, stated that the disease caused by pancreatic insufficiency is uniformly fatal. In cases in which the intestinal tract could be cleared by the use of pancreatic solution through an enterotomy, death resulted

from pulmonary infections in a short time. The authors describe eight cases of their own, including four recoveries. Details of their treatment are given, in which they stress the importance of combined surgical and medical treatment. The surgical treatment consists of the opening of the ileum and removal of all of the meconium by introducing saline and massaging out the bowel content and then closing the opening in the small bowel. No drainage is used or advised. The medical management after operation comprises a diet with a content high in protein and low in fat; a high vitamin intake, including A, B complex, C and D; pancreatic given daily by mouth; the early use of chemotherapeutic and antibiotic agents; frequent check-up, including chest X-ray examinations.

Resection of Frontal Cortex.

R. G. HEATH AND J. L. POOL (*The Journal of Nervous and Mental Disease*, May, 1948) since 1946 have been treating psychotic patients with bilateral ablation of specific parts of the frontal cortex. Four cases are reported. Two patients made a social recovery; one schizophrenic could return home; one improved only temporarily. No complications occurred.

Chemotherapy in Peritonitis due to Perforation of an Abdominal Viscus.

E. M. COLVIN AND FURMAN T. WALLACE (*Surgery, Gynecology and Obstetrics*, October, 1948) discuss the use of sulphonamides, penicillin and streptomycin and the improved results due to the use of these drugs in the treatment of peritonitis secondary to contamination from the alimentary tract. Their conclusions as to dosage in the chemotherapeutic regimen are as follows. In cases of early peritonitis with little contamination of the peritoneal cavity 200,000 units of penicillin are left in the peritoneal cavity. Then 100,000 units are given intramuscularly before operation, and every two hours after operation for ten to twelve doses. If by that time the temperature and the peritoneal signs are normal, the dosage is reduced to 100,000 units every three hours for eight doses and then 50,000 units every three hours for another forty-eight hours. The sulphonamides are not ordinarily used in this type of case, and streptomycin is reserved for use if it appears that penicillin is not producing satisfactory results. This can usually be determined within twenty-four to thirty-six hours. In cases of localized peritonitis with abscess formation, both penicillin in dosage of 50,000 to 100,000 units given intramuscularly every three hours and sulphonamides in usual dosage given either by mouth or intravenously are used both before and after operation.

If contamination of the general peritoneal cavity is known or suspected after incision and drainage of the abscess, the penicillin dosage should be 100,000 units every two hours for as long as is necessary. Penicillin and sulphonamides are both of value administered locally in the abscess cavity, 200,000 units of the former and not over five grammes of the crystalline form of the latter being the recommended dosage. In certain instances it may be feasible to irrigate the abscess cavity with a solution of penicillin. Streptomycin is reserved in these cases, as in the first group, for use if penicillin and the sulphonamides seem

inadequate. In cases of advanced peritonitis in which there is gross contamination of the peritoneal cavity with a purulent exudate present, the authors feel that all three drugs should be used as long as is necessary in adequate dosage as follows: penicillin 100,000 units given intramuscularly every two hours with 200,000 units left in the peritoneal cavity at operation; streptomycin 0.1 to 0.3 grammes every three hours in the usual case or as much as 0.5 grammes every three or four hours in more severe cases; sulphonamides in usual dosage given either by mouth or intravenously, usual dosage being approximately 1.0 to 1.5 grammes every four hours. The crystalline form of the sulphonamides, not exceeding five grammes in amount, may be used in the peritoneal cavity.

Evolution and Treatment of Tuberculosis of the Hip.

IGNACIO PONSETI (*Surgery, Gynecology and Obstetrics*, September, 1948) presents a study of the evolution and the results of conservative treatment in 31 proved cases of tuberculosis of the hip, followed for a minimal period of four years. The patients were studied under three groups: (i) primary paraarticular lesions—seven patients, all children; (ii) tuberculosis of the hip joint in children under fifteen years of age—fifteen patients; (iii) tuberculosis of the hip joint originating in the adult—nine patients. In the first group, while there was a tendency for the tuberculous osteitis to heal under prolonged conservative treatment, sooner or later, however, the hip joint was invaded. Once the hip joint was involved, either it fused spontaneously or a fusion operation had to be performed because of persistent pain and deformity. The proposed treatment of tuberculous osteitis close to the hip joint is directed towards obtaining an ankylosed joint as soon as the local process is quiescent and the general condition of the patient is favourable. No time should be wasted trying to heal the osteitic process by prolonged immobilization, because the hip joint becomes sooner or later involved in the great majority of cases. In the second group, the author expresses the opinion that the best results are obtained with hip-fusion operations of the intraarticular and extraarticular methods combined. The optimum time for surgery is during the third year of the disease, and a subtrochanteric osteotomy is recommended at the time of surgery to abolish for a time the action of the adductors. In the third group, the evolution of the hip disease varied more widely in adults than in children and in many cases was closely related to the evolution of pulmonary tuberculosis. The results of treatment in this group also varied more widely.

The Viability of the Gut.

E. WIRZIG (*La presse médicale*, July 10, 1948) describes a quick method of determining the viability or otherwise of a loop of gut of doubtful vitality found during operation for strangulated hernia, mesenteric thrombosis, abdominal injury and the like. A little sterilized common salt is sprinkled from a salt shaker onto the loop of gut which is in question. Around each grain of salt, if the loop is viable, there generally appears immediately a minute pink area, which gradually increases in size. If the gut is non-viable, no such reaction occurs.

British Medical Association News.

SCIENTIFIC.

A MEETING of the Victorian Branch of the British Medical Association was held at the Medical Society Hall, Albert Street, East Melbourne, on June 2, 1948. MAJOR-GENERAL F. KINGSLEY NORRIS, the President, in the chair.

Facilities for Post-Graduate Study Abroad.

The meeting took the form of a symposium on facilities for post-graduate study abroad by medical graduates who had recently returned from study overseas.

Major-General Norris, who as Director of the Melbourne Permanent Post-Graduate Committee had recently visited the United Kingdom and the United States of America, said that before a decision was made to proceed to the United Kingdom for post-graduate medical study, it was necessary to appreciate the conditions as they existed abroad.

Because of the generous rehabilitation provision for ex-service medical officers of the British forces and because of the uncertainty of future medical practice within the United Kingdom all hospital resident positions and post-graduate classes were filled to overflowing by local graduates, and it had to be understood that the conditions before the war when any medical graduate from Australia could reasonably anticipate a salaried hospital appointment while he was undergoing post-graduate medical study no longer existed.

In an endeavour to obtain better conditions under a nationalized medical scheme far more medical graduates than formerly were endeavouring to obtain higher qualifications, and what had been aptly described as an epidemic of generalized multiple diplomatosis had spread over the United Kingdom somewhat to the prejudice of certain graduates better equipped for such study. However, an assurance had been obtained from Sir Francis Fraser, the Director of the Post-Graduate Federation of Medicine, London, and from the deans of the various post-graduate schools that, provided a graduate from Australia was recommended by some responsible body, every endeavour would be made to provide the study desired.

In Victoria, under the Melbourne Permanent Post-Graduate Committee, a Sponsorship Committee had been appointed to consider any applications from those wishing to go abroad. Particulars might be obtained from the Post-Graduate Committee.

There were certain scholarships available for overseas post-graduate study, the attainment of which sufficiently stamped the applicant for priority of consideration. These scholarships were granted by the Nuffield Foundation, the British Council, the Royal Australasian College of Surgeons (Gordon Craig Scholarships), the Royal Australasian College of Physicians (the Wunderly Scholarships) and the Returned Soldiers and Sailors League of Victoria, the Rockefeller Foundation and the Carnegie Trust. Particulars of them might be obtained from the Melbourne Permanent Post-Graduate Committee.

It was necessary to realize the minimum amount of money considered necessary during one year in the United Kingdom. Apart from fares (ship £107 to £182, air £260 sterling to £300 sterling) a single man should have at least £500 sterling, and a married man at least £800 sterling, and it was desirable that a period of not less than twelve months' study should be planned.

Accommodation in the United Kingdom, as elsewhere, presented great difficulties, but this might be available in "London House" for single men, and, with due notice, in "Foundation House" for married men.

The British Medical Association had established an Empire Medical Advisory Bureau concerned with overseas graduates in regard to study, accommodation and amenities. This was under the direction of Dr. H. A. Sandiford at British Medical Association House, Tavistock Square, London.

It could not be stressed with too much emphasis that it was essential for all arrangements as to accommodation and study to be completed before departure from Australia, as otherwise considerable time would be spent in endeavouring to make these arrangements after arrival in the United Kingdom.

Already there was available in Australia the advice of graduates from Australia who had recently returned from the United Kingdom after post-graduate study in the various branches of medicine and surgery. This advice was readily available through the Melbourne Permanent Post-Graduate Committee.

DR. R. R. ANDREW dealt with gastro-enterology. After stressing the view that a visit to the United Kingdom was worth all the time, trouble and expense involved, he referred to the British Post-Graduate Medical School. This was situated in a London City Council hospital about five miles from the city of Hammersmith. It was an independent body operating under a Royal Charter and recognized as a medical school by the University of London, although there was no undergraduate teaching there. It supplied a need difficult to fulfil for post-graduates, namely, clinical material and facilities for examining patients, ward rounds and bedside teaching, pathological demonstrations at post-mortem examinations each day, a pathology museum and libraries for electrocardiography and radiology. In addition, there was a very good course of formal lectures by the staff and by well-known London clinicians. There was a weekly clinicopathological demonstration and regular clinical meetings were held.

The Professor of Medicine was Dr. John McMichael, and included on the staff were Dr. Paul Wood (a Melbourne graduate), Dr. Bywaters, Dr. Sharpey-Schafer, Dr. Sherlock and others. The pathologist was Professor Dible.

From the point of view of examinations it was a big advantage to work in such a place where all those facilities were under one roof. However, the school was opposed to the policy of preparing post-graduates for higher degrees. Its object, no doubt an excellent one, was "to educate the student in a scientific approach to the problems of clinical medicine, not to coach him for examinations". This viewpoint about degrees held in the centre of post-graduate medicine in the United Kingdom was, in Dr. Andrew's opinion, open to argument. In England, as in Australia, teaching hospitals still required the possession of a higher than qualifying degree by those whom they appointed to their staffs, and while this obtained, one could not but strongly advise those seeking a career in clinical medicine to be mundane enough to pass their "Membership".

At the Post-Graduate School one could attend as a student as a house physician, and as teaching was continuous except for about two months in the summer, it did not matter when one started. The didactic lectures were excellent, the bedside teaching was of a high order, and the weekly clinical pathological demonstrations were always of great interest and profit. It was advisable for either position—student or house physician—to apply as far ahead as practicable. The school suffered greatly from overcrowding, but this was true of nearly all hospitals in the United Kingdom where teaching was carried out.

A considerable volume of research work was done at the hospital, some of it the most interesting work in pathology and physiology being done anywhere. However, this was very much a closed camp. The influence of this work, however, permeated the whole school which had markedly the flavour of experimental physiology.

Summing up, he could say that there were considerable advantages to be gained from a three or six months' session at the Post-Graduate School, and indeed there was nowhere else in London where an outsider could go to for general clinical work with ancillary aids, and for the purpose of passing the "Membership".

In gastro-enterology there was a feast at the Central Middlesex Hospital, one of the large Middlesex County Council hospitals characteristically enough not "central", but near the Post-Graduate School, and not to be confused with the Middlesex Hospital in the West End which was an undergraduate hospital of maturity and excellence. The Gastro-Enterology Department was in charge of Avery-Jones and consisted of sixty beds, male and female, with an outpatient and a follow-up department. The clinical material was very large and the record system was excellent. Included in the department were "metabolic beds" with a considerable number of diabetics. There were usually three or four overseas doctors who attended the clinic for six to twelve months. There was a weekly gastroscopy session at which six to ten patients were examined in close liaison with the radiologist. Large numbers of gastroscopic examinations were done by Mr. Norman Tanner at the London County Council Hospital, Balham. He made fifteen to twenty examinations in a morning and had had huge experience in this, besides being one of the most skilful gastric surgeons in the United Kingdom. Herman Taylor, who invented the "H.T." gastroscope at "Barts", and Rogers at the London Hospital were also skilled gastroscopists of wide experience.

Dr. Andrew strongly advised all physicians interested in gastro-intestinal diseases to attend the outpatients' department at Saint Mark's Hospital for rectal diseases once or twice weekly for several months. A large number of Australians had been house surgeons or resident surgical officers there and they were very favourably regarded. The surgeons

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on the staff all held positions as general surgeons in teaching hospitals in addition to their Saint Mark's appointment. One saw there, in addition to patients with the usual surgical rectal and colonic diseases, a large number suffering from ulcerative colitis. Cuthbert Dukes was the pathologist.

In regard to examinations and coaching, Dr. Andrew agreed with Dr. Stanley Reid that there were considerable advantages in going to the Royal Society of Medicine, whatever work one was doing. There were a number of good coaches—registrars on teaching hospitals—who could help one greatly. One could learn from them quite a few local rules and something of the censors whom one would face later. It might be almost as important to diagnose one's examiner as one's patient. The fields were very large and there could not but be considerable element of luck, so it was advisable to sit within a matter of months on arrival rather than to wait for nine to twelve months in order to make it a certainty. Many hot favourites had crashed and many maiden performers from the bush had romped in.

The examination, as a result of these large fields, no longer was conducted with the leisurely old world ceremony which once obtained, especially for the veteran sitter.

In conclusion, Dr. Andrew spoke warmly of the Nuffield Foundation. The Foundation was extraordinarily generous with its time, not only to Nuffield Fellows, but to all overseas doctors in London.

Dr. T. H. STEEL, speaking on chest and general medicine, said that the Brompton Hospital had been regarded for years as the centre of clinical teaching in diseases of the chest. The demand for further study of chest disease had made necessary more extensive facilities than had been available in the past. The present facilities were much as when Dr. Steel had known them and he proposed to describe the present arrangements and to indicate the plans for the future.

The Brompton Hospital was, of course, a special hospital and undertook no undergraduate teaching. The members of the honorary staff held other appointments either on the honorary staffs of one of the general hospitals or in a few cases at the Post-Graduate School at Hammersmith. The Dean of the Medical School was Dr. J. G. Scadding, and through him all arrangements for post-graduate study were made.

At present there were held three-monthly courses in diseases of the chest for post-graduates. They were part-time courses in that they occupied only about half the full week of the post-graduates' time and could be combined with part-time courses at other hospitals. Included in these courses were a weekly ward round with a physician, demonstrations in the out-patient department, pathological demonstrations and a systematic series of lectures. The registrars took groups of students round the wards where they were allotted patients to examine, who were then discussed as a group. Demonstrations were arranged in the technique of artificial pneumothorax and bronchography.

A limited number of appointments as resident house physicians were available, the appointments being held for six months, the number of house physicians being six. In addition there were available six non-resident appointments as house physicians for ex-service doctors under the government demobilization scheme. Necessarily, as a house physician, one had to do a considerable amount of routine work in the wards, in the out-patient department, and in the artificial pneumothorax clinic.

Towards the end of the previous year the Brompton Hospital, or rather the teaching side of it, had become an Institute of Diseases of the Chest, fostered by the British Post-Graduate Medical Federation. Plans were in operation to widen the scope of the teaching. Further buildings were required and should be completed by the middle of 1949. Here it was intended to provide a lecture theatre, a library, a museum, and other facilities for post-graduate students. Laboratories would be provided which would be devoted entirely to research and not to routine work. The full-time staff of the institute would be increased and whole-time courses of study in chest disease would be organized. The prime function of the institute would be to provide instruction for those intending to take up chest work as a specialty and for those who were already specializing in that subject. Facilities would be provided for suitably qualified people who had approved research projects in that field. To provide the training which only some sort of clinical responsibility could give, it was intended to increase the number of available appointments as house physicians. In addition to the institute and its associated hospitals, various other centres provided facilities especially for the study of thoracic surgery.

It was desired that all applications from overseas should be sent to the Director of the British Post-Graduate Medical

Federation, who would refer suitable applications to the institute.

The British Post-Graduate Federation was in a position to organize an integrated scheme of study for each graduate which might involve study at more than one institute—for instance, general medicine might be revised at the same time.

Those who intended to study neurology would, of course, wish to work at the National Hospital in Queen's Square. Here the Dean was Dr. Purdon Martin. The weekly clinical demonstrations held on Saturday mornings were attended by about 200 post-graduates and were always of very good value. It was necessary to apply as soon as enlistments were accepted, as these sessions were very popular. For those who wished to spend more time at neurology, morning attendances in the out-patient department could be arranged. Twice a year, in January and October, there were held three-monthly full-time courses in neurology—out-patient demonstrations, pathological demonstrations and lectures. A limited number of men were attached to individual firms, if it was their intention to practise neurology as a specialty.

The Fellowship of Post-Graduate Medicine at 1 Wimpole Street, London, W.1, arranged a number of concentrated courses in special subjects. Any post-graduate in London should keep in touch with that organization.

Courses in infectious diseases, for instance, were organized by Dr. Stanley Banks at the Park Hospital at Hilton Green.

The Fellowship also ran at the Cancer Hospital a sort of trial run for the "Membership". Patients were provided for examination, pathological specimens and microscopic slides and skiagrams were put out and the candidates were questioned by examiners as in the "Membership" examination.

It was easier to indicate where to go in London for the study of special branches of medicine than for a general refresher of the subject as a whole. In Dr. Steel's opinion, it was wise for those who intended to study abroad to do as much as possible in Australia of their general revision of medicine before leaving the country.

The London Hospital ran a "Membership" course for twenty students and the demand was always more than could be met. Among the prominent teachers, Donald Hunter was conspicuous and the *tour de force* put on by him at an out-patient demonstration had to be seen to be believed.

The county council hospitals had a wealth of clinical material and had a high standard of clinical work. Probably the best of these were the Middlesex County hospitals.

There were a few jobs available to those with push and drive and at the moment there were five Australians on the staff of Harefield.

Edinburgh had always taken a prominent place in post-graduate teaching.

Courses in internal medicine lasting eleven weeks were arranged to start in April and October of each year.

The standard of work covered was such as might be considered suitable for graduates requiring a refresher course in the current outlook on medicine or for graduates preparing to become specialists in medicine. Approximately two hundred and eighty hours of instruction were provided with lectures on applied anatomy, physiology and pathology, together with systematic lectures on medicine and therapeutics. Clinical demonstrations were included and ward visits for sections of the class were arranged at the Royal Infirmary, Edinburgh, and at other hospitals in the vicinity.

Dr. H. B. KAY spoke on cardiology. He said that in London the main centre of cardiology was the Institute of Cardiology, Westmoreland Street, W.1 (which was attached to the National Heart Hospital). This was entirely devoted to post-graduate education, and the honorary staff represented the leading opinions in English cardiology.

Students should first see the Dean, Dr. Paul Wood, who would give them helpful advice in regard to their problems. Various types of courses were available:

1. Full-time course for three to six months, which included attendance in out-patient departments, ward rounds, demonstrations and a comprehensive set of lectures. Between ten and twenty students were accommodated at one time.

2. Short two-week courses comprising a rapid review of the more important aspects of cardiology.

3. Attendance at out-patients' sessions, which were held every afternoon and on Tuesday and Wednesday mornings. Approximately twenty to thirty students attended each session, and there was considerable overcrowding.

4. For students with especial interest in cardiology there were six registrar appointments available. The student was expected, besides carrying out routine work, to apply himself to some particular research problem.

Alternatively, the student might go to the cardiac clinic of one of the undergraduate teaching hospitals: The London

Hospital (Sir John Parkinson and Dr. William Evans), Middlesex Hospital (Dr. Evan Bedford), Guy's Hospital (Dr. Maurice Campbell), King's College Hospital (Dr. Terence East). Facilities were also available at the British Post-Graduate Medical School at Hammersmith. Dr. Paul Wood was the consultant cardiologist.

The only cardiac clinics in the provinces of which Dr. Kay had any detailed knowledge were those at Manchester (Dr. Crichton Bramwell) and Hull and Grimsby (Dr. Brown). In Edinburgh, the cardiac clinic was conducted by Dr. Gilchrist and Dr. Ian Hill.

However, before deciding on any plan of action, the student desiring to undergo further training in cardiology whether (a) as a full-time project or (b) as part of a general post-graduate training, should in the first instance contact the dean of the institute. Incidentally, Dr. Paul Wood was a Melbourne graduate and had been very helpful to Australian students.

DR. S. F. REID spoke on surgery. He said that he would digress for a moment from the curricular aspects which he had to discuss, to emphasize a point, and that was the extra-curricular education, which had, in his opinion, perhaps not had the emphasis it deserved. Whatever time one felt might be justifiably expended in learning surgery abroad might be somewhat added to and well spent in learning those things which England still yet had in abundance: a culture, a history and a way of life not yet available in the Australian part of the New World. In general, the curricular studies were not directed exclusively to the passing of an examination and did not finish with it, but there was much surgery and much of professional interest to be learned from other than tutors, and not necessarily to satisfy examiners. Not the least were a superb lucid thinking, a clear logic and almost laudable common sense in deduction unequalled in any other centre he knew.

For the purposes of classifying a discussion on the facilities available, Dr. Reid offered advice to a series of hypothetical post-graduate visitors to England who would fit more or less one of the following categories in what must, perchance, be a very loose series of headings.

The first group comprised those who went to learn surgery, in other words post-graduate students recently graduated, but who had had minimal or no post-graduate training in Australia. Dr. Reid wished very emphatically to discourage all those people from going to England for post-graduate study and his reasons for doing so were: (i) They were unknown in Australia when they left. (ii) They were unknown in England upon arrival. (iii) They were unknown in Australia on their return. (iv) England at the present moment was no place to learn basic surgery and to do the chores and preliminaries.

Previous speakers, in particular General Norris, had drawn attention to the enormous overcrowding in England at present in all clinical schools. Jobs of the right type for training and in acceptable centres for candidates preparing for the examination were extremely hard to come by. Anyone interested in surgical study should indicate that fact to themselves and to the local authorities by carrying out the study for, submitting for, and qualifying in the local post-graduate examinations in surgery. In other words: (i) Surgery should be learned in Australia. (ii) The local post-graduate examinations should be undertaken. (iii) Surgical ideas should be sorted out according to local teaching, but it was necessary to be humble enough and wise enough to realize that they might require modification. (iv) The Primary Examination should be passed in Australia if the intention was to sit for the Final Fellowship Examination in England.

It was probable that there would be a primary examination for the English Fellowship later in the year in Australia. For those who went over to do the Primary Examination after the other local degrees, the following were the facilities for study. The courses for the English Fellowship were (a) Middlesex Hospital, (b) the Royal College of Surgeons, (c) a course at the Cancer Hospital run by the Fellowship of Post-Graduate Medicine.

The examination was held in April and October and there had been in the previous two years an extra examination in January. These courses lasted for some fourteen weeks before April 1 and October 1. They were greatly sought after and difficult to get on to, and Dr. Reid could offer no advice on their value or the methods by which entry to them might be gained. Presumably courses would also be run for the Edinburgh Fellowship Primary Examination which was now a two-part examination and it might be that there would be reciprocity between these two examinations at least in regard to the Primary Examination. Extra tuition was available from quite a number of sources, the

detail of which could be given to those interested by the Post-Graduate Committee.

The second group described by Dr. Reid comprised those who went to pass an examination (F.R.C.S.) and also to see surgery. These would probably include the greatest number of those who visited England for post-graduate surgical study and this group was given a dual heading because Dr. Reid believed that no graduates should go to England only to pass an examination, and he also believed that that examination was still a very commendable, if not essential, part of post-graduate study in England. It was still, after all, a hallmark. It was not, any more than any other degree, a stamp of surgical competence, but it was nevertheless, a clear indication that the criteria, even if theoretical, of what was probably still the most exacting clinical school in the world had been satisfied.

Courses available for the Final Fellowship Examination were at: (a) Guy's Hospital. There were ten places reserved on this course for Australians, a most praiseworthy arrangement for which they had to thank General Norris's liaison with Mr. Hedley Atkins, Director of Surgery at Guy's Hospital. (b) Saint Bartholomew's Hospital. The courses at Guy's and Saint Bartholomew's Hospitals seemed to accommodate the greater proportion of Australians and were held in the ten weeks before each of the May and November examinations. They, in common with all the other London courses, were overcrowded and booked out months ahead. (c) London Hospital. This course was, Dr. Reid thought, held only once a year. (d) Hammersmith (under the auspices of the Post-Graduate Medical Federation). (e) The Cancer Hospital, which had a clinical course and an operative surgical course. Both of these were run by the Fellowship of Post-Graduate Medicine.

Extra tutorials and clinics were available.

Having successfully negotiated the Fellowship, Australian students would, Dr. Reid hoped, spend the remainder of a minimum total time in England of twelve months in "seeing" surgery.

Those who went to England to see surgery comprised Dr. Reid's third group. These would include: (a) Those successful examinees in his second group. (b) Holders of scholarships who, to satisfy the terms of the scholarship, refrained from submitting for examination. (c) Those who visited England on "refresher" visits.

The word "see" was used deliberately and signified those who would visit, perhaps once, or many times, or continually, or be attached to, any clinic, supernumerary.

For those whose interest was general surgery there were specialist units for the various subjects. By and large, it was true to say that the general surgeon best learned the specialties from the specialists, or those with special interests.

Dr. Reid thought that a visit to the limb-fitting centre at Roehampton was well worth while, likewise a day spent at the Paraplegic Unit at Stoke Mandeville. London was not England and Dr. Reid did not want his audience to gain the impression that he thought students would see all, or by any means the best, surgery in London. Units other than those in London should be visited, for example, a visit to Edinburgh was most emphatically worth while; there the whole of the surgical teaching organization was exemplary and the best that Dr. Reid had seen. The Nuffield Research Unit at Oxford was a *sine qua non* visit. The Society of Surgeons of Great Britain and Ireland would probably have an annual meeting of some few days' duration which was well worth attending if an invitation could be obtained.

On the notice board of the College of Surgeons daily there was posted a list of the operations for the day at the various London hospitals. Students would be welcome at any hospital to view operations. The kindly welcome was not limited to appearances at public hospitals.

Dr. Reid's fourth group comprised those who went to study a specialty. He presumed that they would be the only ones of all the people under discussion for whom residence in practical work in, and fairly long attachment to a specialist institution was essential.

Dr. Reid said that he could not be too emphatic in his advice to all in that particular group that, whether they were advised by scholarship or local authority or travelling freelance, apprenticeship in a specialist unit should be arranged before they left Australia. For those in the group for whom such prolonged apprenticeship was not possible or not necessary, there were specialist courses run by the Post-Graduate Medical Federation in various "Institutes".

In conclusion, Dr. Reid said that all books were hard to obtain, so that the student should take his own. There were many excellent libraries such as those at the Royal Society of Medicine, the Royal College of Surgeons, the British Medical Association and London House. H. K. Lewis and Company had a hire loan system that needed no introduction.

There were many other things which intending students abroad would want to know, and Dr. Reid, in common with the other speakers, would be very glad to help anyone in any way possible. Most of the information required was available for the asking at the Melbourne Permanent Post-Graduate Committee's office.

Correspondence.

INFECTION: A HOSPITAL PROBLEM.

SIR: The pre-Listerian era of surgery can justly be called the putrefactive one. Future historians may with some vindication dub our age the septic one—not paradoxically, for, with an expressed ideal of asepsis, we are not rampantly dissatisfied with the more than occasional sepsis in operative wounds. Surgeons are therefore beholden to Professor Rubbo for his paper on "Infection: A Hospital Problem" (THE MEDICAL JOURNAL OF AUSTRALIA, November 27, 1948). It must, in some measure, jerk us out of our complacency in the face of wound sepsis.

It is difficult to have a thorough comprehension of the principles of any practice without a working knowledge of its history. With Professor Rubbo, we deplore the failure of modern authorities on surgery to teach the history of asepsis. The lack of historic knowledge accounts, at least in part, for our tranquillity in regard to our methods. An extension of the professor's historic Listerian assessment is therefore necessary, for the saga of Lister ought to be our stimulus to greater efforts to end the truce between bacteria and surgery.

I fear there is a tendency to remember Lister rather by the evils or failures in his methods than by those brilliancies and scientific deductions which changed the face of the world. The aerosol carbolic spray is noteworthy in this respect. This was but an incident in the chief's career, for once he recognized his inability to sterilize the atmosphere, he abandoned the attempt (1887), at the same time not making any essential change in his antiseptic or aseptic methods. Indeed, he did what was rare among us, by publicly confessing his shame of his error. It is therefore not fair, or accurate, to say of Lister that "attention was concentrated on the air as the primary source of septic infection", without an enlargement on Lister's later clearer vision. In truth, he doubted the efficiency of the carbolic spray for a long time before he gave it up, treading warily in his progress in the new science of asepsis. Curiously enough, we moderns have attacked Lister's *bête noire*, the air, with but little more practical success. He regarded its disinfection as impossible. If Lister ever regarded the air as the primary source of infection as Professor Rubbo states he did, it must have been for only a short time in his early progress; for he taught, while still using the spray, that organisms infect all objects about us, and clearly stated that the infection in the air was on the dust.

The professor lists three important principles of asepsis, to wit, the exclusion, removal and destruction of bacteria. These principles are pure Listerism, the very objects of all Lister's art and efforts. The antiseptic principle was two-fold—to have the wound entirely free of pathogenic organisms and to prevent any chance of post-operative (or secondary) infection. He speaks of the "asepsis" of his methods long before von Bergmann popularized the term. To achieve asepsis he preferred the chemical method of 1 to 20 carbolic acid disinfection to von Bergmann's ways. It is quaint and regrettable that our methods inherited from the latter great pioneer should be called "aseptic" in contrast with Lister's antiseptic ones. Clearly, we would be scientific and historically accurate to refer to the physical (von Bergmann) and chemical (Listerism) methods of asepsis. This adoption of terms would, in itself, give the inquirer a rational historic perspective.

In the 1 to 20 carbolic solution, Lister sterilized hands, instruments, packs, sponges, sutures, dressings—and operation skin fields. The latter were not "swabbed" with antiseptic, but were subjected to it for some minutes. (When the chief came into the theatre, the compress of carbolic solution was applied to the skin, and stayed there till he was ready.) He did not wear a sterile gown perhaps, but it is certain that he wore a freshly washed coat or gown. He would not be capable of the illogical absurdity of not doing so. At different times in his practice he irrigated the wound with the carbolic solution, but this was not an essential in his methods. He practised asepsis as far as the light of his days and his magnificent mind enabled him to do so. In

his own opinion he used antiseptics less than other practising surgeons. Antiseptics were never more to Lister than prophylactics—as heat is to us.

The second of Lister's twofold antiseptic principle, the avoidance of secondary infection, has been well-nigh forgotten. During those years when he did not suture many of his wounds, it was a most important part of his methods. Later and today the importance seems less, for suturing was and is the rule. It will ever be important, however, to seal our wounds with dressings that are firmly applied and that will remain fixed and firm for the term of convalescence; to perform our dressings with the finesse described by Professor Rubbo—and in silence—for secondary infection, Lister's great fear, is responsible for at least some of our sepsis. Disgustingly often one sees wound dressings loosely fixed, almost literally rubbing infection into the wound.

Lister would not have dressings sodden with pus. He managed them so that the efflux from the wound was collected by absorbent material, while the actual antiseptic dressing itself was undisturbed. He did not advocate frequent dressings. If Professor Rubbo can stimulate our profession (with its sisters, the nurses) to do our dressings rapidly, hygienically, silently and efficiently, with a no-touch technique, we will have restored a lost art, seen practised at its highest peak by the great Quaker chief. Even the tubercular abscess opened by the chief remained uninfected, because his infection-fast dressing prevented bacterial ingress. Yet when French surgeons tried the same technique in tubercular abscesses, the death rate from secondary invasion was appalling. For it is not enough to follow the way of Lister broadly—the details must be closely imitated.

Text-books, historians and lecturers nearly always refer to the carbolic solution strength used in wounds as 1 in 20. Occasionally Lister himself and some of his associates (for example, R. Morison) mention the same strength. The solution used was 1 to 20, for in the stronger 1 in 20 mixture the acid is likely to fall out of solution, and so is more irritating. When Lister refers to 1 in 20 solution, he clearly means 1 part of acid in 20 parts of water, for time and again, he mentions the 1 to 20 strength. It is time, too, that this historic inaccuracy was corrected.

Professor Rubbo says that "carbolic acid was replaced in 1889 by Lister's salt, the double cyanide of mercury and zinc". Lister used this antiseptic only as the preferred prophylactic for wound dressings (gauze) to prevent the dreaded secondary infection. He showed that the salt was valuable as an inhibitor (only) of bacterial growth. It was while occupied with his researches with corrosive sublimate that he introduced the word "inhibitory" into bacteriology, as a good English equivalent for "Hemmung". Before applying the cyanide gauze to the wound he was wont to draw it through a solution of 1 to 20 carbolic acid, so as to sterilize it. As a non-irritating dressing, to Lister it was the perfect inhibitor. He was wont, also, to coat hairy parts with it. For asepsis he used carbolic to the end.

The chief early appreciated the antiseptic power of the blood and the tissues, following the teaching of Metchnikoff on phagocytosis. By brilliant experiments, he found that the tissues can successfully defeat small squads of bacteria. He said he thought he was the first to grasp this great truth, and stressed it time and again to the students. In this respect, then, von Bergmann certainly but amplified the teachings of the great chief. Lister's faith in the tissues it was that led him to the conclusion that ". . . the atmospheric dust may safely be disregarded in our operations". We do not often find him erring so; still, when he practised irrigation of the wound with antiseptic, that (his) statement was almost justified. Also, if von Bergmann "recognized that the exclusion of pathogenic bacteria from a wound was an essential . . .", he did so because Lister taught him so.

Professor Rubbo says that carbolic acid was an unfortunate choice for Lister to have made. Any other choice, however, might have changed the course of history for the worse, for at first Lister used pure carbolic. It is doubtful, to say the least of it, whether, in this early and vital experimental stage, Semmelweis's hypochlorite would have been as effective in the therapy of the compound fracture on which Lister practised antisepsis for the first time. The chief could not then know that his purposes would be better served by diluted disinfectant. Also, the difficulty in ensuring suitable concentrations in chlorine antiseptics would probably have caused serious variations in Lister's results, whereas carbolic solutions were excellent for an antiseptic tyro. This acid has a strong affinity for epidermis and hair, an admirable characteristic in an antiseptic for surgical use. Moreover, the dangers of carbolic acid have been overestimated, for surgeons used Lister's acid, but not in the Listerian way. It would be wholesome to surgery if we, the

users of antiseptics, were as well acquainted with the properties of our antiseptics as was Lister with his.

The chief tolerated no excuse for suppuration. The calamity affected him as a railway accident disturbs the Commissioner, who thereupon sets up an inquiry. He was never complacent about it and said: "... in such circumstances I have always thought that there must have been some mistake on my part, and I have endeavoured to discover where my mistake lay". If we connote the whole system and practice of surgery in hospitals today as our method, we would do right to heed Lister and endeavour to discover where our mistakes lie. Surgeons could well heed Professor Rubbo in his advising a return to Listerism by purifying the wound with a harmless efficient antiseptic; for without doubt, all surgical wounds suffer droplet or dust contamination and probably mild infection. Is it not reasonable to destroy or wash out this contamination *secundum* Lister?

Some surgeons today sterilize their metal and glass ware chemically, some only their glass ware, and some practise pure Bergmannism. Truly, we can do without neither Lister nor Bergmann. Lister says the antiseptic principle will forever remain one of the fundamentals in surgical practice; as will heat sterilization. Some future generation of surgeons will standardize and police disinfection methods and theatre ensembles. Till then we must depend on our teachers' instilling the Listerian spirit into each student. This spirit will produce an aseptic mind and that is the perfect antiseptic.

Judging from recent criticisms on surgical hygienic practices of today, I am not sure that our wound results are better than Lister's. Since our arms are vastly superior to his, our strategy must be inferior.

Yours, etc.,
JOHN R. S. LAHZ.

Brisbane,
January 4, 1949.

SCIENCE AND POLITICS.

SIR: Sir John Latham, in his Stawell Oration on science and politics, came to the conclusion that "it is beyond the scope of science to prescribe objectives for political action", and we must "place men of quality and character in charge of our affairs". This judgement was supported by a lengthy statement upon the variability of men's morals, the influence of emotion on actions, the possible results of mass propaganda, and the existence of opposing opinions.

This amounts to an almost unqualified support of political opportunism, to the denial that scientific observation can determine the path that man must follow in politics and economics; so that apart from moral considerations, whose uncertainty Sir John admits, the politician cannot know whether a particular policy is in accord with scientific law and therefore sure to be successful in the end, or is not in accord and therefore sure to end in failure.

This hopeless picture of man wandering blindfold in an unexplored, uncharted political wilderness would be depressing, if it were true.

It is not true, however. The reality is that political science has given a verdict that is most unpleasant to Sir John Latham and his friends. Like the occasional patient whom we have all met, they are rejecting a diagnosis that carries a most cheerless prognosis, as far as they are concerned, and is not altogether complimentary to them.

If we wish to avoid such catastrophic ruin as was brought to their countries by those eminent politicians Mussolini, Hitler, Tojo and lately by that most Christian gentleman, Chiang Kai-Shek, we had better listen to science and not to our worthy judge.

Yours, etc.,
GERALD O'DAY.

473 Bourke Street,
Melbourne, C.1,
January 21, 1949.

SIR: Sir John Latham's Stawell Oration (THE MEDICAL JOURNAL OF AUSTRALIA, January 8, 1949) sets one thinking.

Politics—the art of living together as citizens—is still an art and not a science: most sciences began as arts or crafts, and only by the adoption of exact, ideal, invariable units, thus permitting exact measurement, were able to become scientific. Most of these standards derive ultimately from the old "rule-of-thumb" methods (as is evident from their very names, as calculation, grains, ounces, inch *et cetera*). Each science has its own units of measurement: politics needs its own also. The real contribution of science to politics is recognition of the necessity of an exact, ideal and invariable standard; otherwise science may be dangerous to

citizens, for science deals with and controls things, whereas politics deals with people; scientists therefore tend to boss people, to become totalitarian (as, for example, the technocrats).

When one remembers the preponderating part played by money and finance in government, one cannot but realize that the elastic, fluctuating money unit (the market-basket of commodities in some sort of uncertain relation to a gold standard) is a curse to nations, for no measurement in money is reliable or fixed or comparable with another. I well remember once asking an economist if economics could claim to be a science while it used a variable unit. He said he had never been asked that question before!

For decades now governments have tended to organize people (it is our turn now!), forgetting that organized ineptitude is still ineptitude, and that organization destroys initiative by making its application difficult—what Horobin years ago described as "planning for paralysis". Government guidance may be good, but government control means compulsion (and the well-known "government stroke") largely through the power of the purse, and paralysis through regulation. No wonder that thoughtful doctors and thoughtful patients disapprove of "free medicine" which is not free but regulated! Power is a disease of politics, and love of power a disease of politicians. It is no doubt an inevitable concomitant of our present exploiting political system, which is rooted in war and flowers in war; for no one will submit to exploitation unless the exploiter has power behind him.

The objective of politics depends on the religion or philosophy of the politician. Should citizens decide to practise their religion—to accept the second great commandment as their practical guide to everyday economic life, to demand and to give a fair exchange (a pound for a pound's worth), abandoning the profit system (a guinea for a pound's worth), they would soon perceive the need for a new political and economic unit rooted in the individual human being himself (or herself). The elector would achieve freedom for all, while ability, persuasion, and freedom of choice would take the place of physical and financial power.

The present struggle between the profession and the Government is of enormous importance to the community; not only our freedom, but that of our patients, depends on the outcome.

But we cannot win only by refusal, by negation, we must develop a new politics, a new economics, with a fixed, invariable standard unit, the human being.

Yours, etc.,
MARY C. DE GARIS.

Geelong,
Victoria,
January 23, 1949.

SPIRITS AS A DISINFECTANT.

SIR: The letter of "Methylated Spirit" in your issue of January 22, 1949, implies that alcohol is an efficient disinfectant for syringes. The disinfecting qualities of alcohol, either pure or dilute, are well known, and it is sufficient to say here that, while alcohol may kill common vegetative organisms, sporulating bacteria will survive in it for long periods. Quite recently this department's laboratory has isolated *Clostridium tetani* from cotton pads which had been immersed in methylated spirits. It is therefore clear that alcohol cannot be relied on to kill all pathogenic agents.

War Memorandum Number 15, on "The Sterilization, Use and Care of Syringes" (published by the Medical Research Council in 1945), should be read by all users of syringes. This publication points out that in Great Britain one doctor's total career of, say, fifty years, would only represent one two-thousandth part of the annual injection experience of the nursing and medical professions, and warns that too much reliance should not be placed on statements such as "I have always done this, and yet have never had any trouble".

There are only two safe methods of ensuring the sterility of syringes, namely, by exposure to hot air at not less than 160° C. for an hour, or by efficient autoclaving. Boiling in water to which has been added phenol or alkali will also kill spores, but as these substances may react with the medicament to be injected they are not recommended.

For disinfection (not sterilization) of syringes by chemical agents, the Memorandum states that the only chemical that can in any way be recommended is 70% to 75% V/V alcohol. This is used with all-glass syringes which are intended for the injection of a sterile fluid, such as insulin, in circumstances where heat sterilization is impracticable. The syringe should be rinsed in clean tap water, filled with spirit and discharged several times, and finally dismantled and

immerged completely in spirit in a covered container for at least five minutes. The syringe is then assembled, rinsed in sterile water if desired, before being placed in a covered container until it is used.

Disinfection of syringes by alcohol is certainly convenient, but should not be regarded as ideal, and should have a very limited place in hospitals where efficient sterilization facilities are available. Nurses and medical students should be taught that the only safe syringe is one that has been heat sterilized.

Yours, etc.,

D. W. JOHNSON.

Department of Public Health, Queensland,
Brisbane,
January 26, 1949.

WHITE BREAD VERSUS BROWN.

SIR: My attention has been drawn to a reference in THE MEDICAL JOURNAL OF AUSTRALIA, November 27, 1948, entitled "White Bread versus Brown", in which McCance and Walsham are stated to have confirmed absolutely the earlier view that wholemeal leads to an adverse calcium balance. They even refer to one experimenter suffering from an attack of tetany as a result of phytic acid poisoning.

I would like to draw attention to the fact that only some eighty or so years ago all European people consumed wholemeal flour and meals, and that a large number still do. It would seem unreasonable to assume from the results of experiments carried out on a few experimentees that the whole of our ancestors for centuries suffered from an adverse calcium balance, and that tetany was a common malady. There is not the slightest evidence that individuals who normally consumed wholemeal products suffer from adverse calcium balance or from tetany.

The conclusion which I draw is that under the conditions of experimentation, McCance and Walsham did find these results, but that the explanation lies elsewhere than in the simple assumption that the phytic acid is the whole cause. What, for example, is the nature of the intestinal flora of the experimentees who suffer from this calcium imbalance? Does the continual consumption of wholemeal products establish an intestinal flora, an enzyme system, which enables normal nutrition to proceed. I am loath to conclude that sufficient calcium carbonate gained access to meals stone-grits by our forebears from the mill, since this is not sufficient quantity to neutralize the effects of the phytic acid.

History, it would seem to me, carries more weight than laboratory experimentation with a few human beings for a brief period of time.

Yours, etc.,

C. STANTON HICKS,
Professor of Physiology.

The University of Adelaide,
Adelaide,
January 18, 1949.

STREPTOMYCIN TREATMENT IN TUBERCULOSIS.

SIR: The use of streptomycin as an antibiotic in tuberculosis has been the subject of great medical and popular interest during the past few years. I think it would not be an exaggeration to say that almost every issue of English and American journals concerned with diseases of the chest for the past two years or so has contained one or more articles or references to the subject. In addition, many references have frequently appeared in *The Lancet*, the *British Medical Journal* and THE MEDICAL JOURNAL OF AUSTRALIA. As with any new remedy of repute and, alas, some of ill repute, enthusiasm of the profession and the public is deeply stirred, especially if hope of cure for diseases such as tuberculosis, cancer and others might be realized.

The miraculous early response to the use of streptomycin in many cases of acute miliary tuberculosis, with and without meningitis, acute tuberculous pneumonia and the like, is, of course, becoming widely known. It is indeed dramatic that, in a considerable number of patients suffering from tuberculous meningitis, the progress of the disease has been checked, and this where the mortality rate has hitherto been 100% in a few weeks.

What is not sufficiently realized is that there is a comparatively limited field in which streptomycin should be used. With the passage of time, this field is becoming more limited still.

I am prompted to write concerning this matter because of frequent suggestions that certain patients might receive

benefit from streptomycin therapy. Despite all that has already been written, it is felt that the need for the greatest care in the selection of suitable cases cannot be over-emphasized. Further, in the latest issue of the *British Medical Journal* to hand (December 11, 1948), the work of Crofton and Mitchison on streptomycin resistance and the associated leading article give a most salutary warning that a patient who has had streptomycin treatment may pass on tubercle bacilli to another which may then be entirely resistant to streptomycin.

For the present, therefore, it can be said in general terms that it is most desirable to restrict the use of streptomycin to patients suffering from very acute exudative disease. Further, if there is a possibility of surgical treatment, such as pulmonary resection or thoracoplasty, its use should be reserved as a cover for the operative procedure.

As a corollary, it is bordering on charlatanism to order its use in patients who are the victims of chronic fibroid phthisis and the like. These unfortunate folk possess lungs which have been largely destroyed and excavated. Little lung tissue for respiration remains, and no drug on earth can ever repair the damage of the past battles.

I believe the day may not be so far distant when a chemotherapeutic agent, truly effective against the tubercle bacillus, will be discovered. In the meantime, the present methods of early case finding and effective sanatorium and surgical treatment, together with public education and B.C.G. vaccination must be still further implemented.

Yours, etc.,

G. BRUCE WHITE.

Sydney,
February 1, 1949.

MAGNESIUM IN DYSMENORRHCEA.

SIR: Having suffered from severe dysmenorrhcea for many years it was with much interest that I read Dr. Rawlings's article on the use of magnesium.

It may interest him to know that for three successive months I took 20 grains of magnesium gluconate daily for a week before the expected date of onset of the period, without any beneficial result on either the premenstrual discomfort or the menstrual pain.

I feel that Dr. Rawlings somewhat under-estimates the psychological factor. In my school days I tried various remedies for dysmenorrhcea, as suggested by the local general practitioner, and some of them produced improvement lasting several months. Looking back I feel sure that the psychological factor was largely responsible.

Also as every woman who suffers from dysmenorrhcea knows, the severity of the pain varies considerably from time to time for no apparent reason.

I noticed that quite a number of Dr. Rawlings's cases obtained improvement during the summer months. I would like to ask Dr. Rawlings whether he had noticed dysmenorrhcea to be more severe in the winter.

For many years I have noticed that I get more severe attacks in the winter and since moving to a cooler climate recently have been considerably worse.

Finally is one justified in assuming that sufficient magnesium is absorbed to affect the uterine muscle when it has been shown that a single dose administered usually does not significantly affect the plasma magnesium?

Yours, etc.,

"WOMAN DOCTOR".

TREATMENT OF HEADACHES OF A MIGRAINOUS TYPE.

SIR: As the years go by we still are presented by numerous patients with the problem of migraine—"bilious attacks" or sick headaches. The fact that so many of them complain of such attacks continuing for years is enough to prove that so far no definite cure or prophylactic has yet been found.

As in so many of our problems, the difficulty lies in the finding of the cause, as once the aetiology of a disease or symptom complex is discovered it is not long before a satisfactory method of treatment is produced. Various theories as to the cause have been advanced among which are allergy, hypoglycaemia, vasomotor disturbances. But the follow-up of these theories has failed to give us the necessary lead in treatment.

Over the past few years I have been using empirically a treatment which has given excellent results in the preven-

tion of attacks. I have used it in thirty-seven cases with satisfactory results in thirty, moderately satisfactory results in two, no improvement in one case; and four patients were untraced.

I feel I am justified in these results in putting before my *confrères* a treatment at least worthy of a trial in a symptom complex which at least is a nightmare to those who suffer from it. I order *Tabella Caffeina Composita* (phenazone three grains, caffeine one grain), one to be taken night and morning, and also *Tabella Phenobarbitone* half a grain, one to be taken night and morning. I instruct the patient to continue for three months, that is, 200 tablets of each, and then to report. If they are satisfied with the result, as in most cases they are—some are very enthusiastic—I repeat the tablets for a further three months. As nearly all the patients report that they are free from attacks or have only a very occasional attack after six months' treatment, I advise them to suspend further treatment and to report again if the attacks recur.

I realize that my series of cases is small, but still in general practice one does not see so many patients with migraine.

I publish this preliminary report in the hope that it might be useful to my colleagues.

Yours, etc.,
CLYDE DAVIS.

Pennant Hills,
New South Wales,
August 27, 1948.

Post-Graduate Work.

THE MELBOURNE PERMANENT POST-GRADUATE COMMITTEE.

Course in Dermatology.

A COURSE of ten clinical lectures and demonstrations in dermatology suitable for general practitioners, arranged by the British Association of Dermatology and Syphilology (Victorian Branch), will be conducted in March, on Tuesday and Thursday afternoons at 2 p.m.

Details of the course may be obtained from the offices of the Melbourne Permanent Post-Graduate Committee. The fee for the course is £5 5s. Application for enrolment should be made to the Secretary of the Committee, 426 Albert Street, East Melbourne, JM 1547, as soon as possible.

Congresses.

INTERNATIONAL CONGRESS ON RHEUMATIC DISEASES.

THE seventh International Congress on Rheumatic Diseases will take place at the Waldorf Astoria in New York City from May 30 to June 3, 1949, inclusive. It is sponsored by the International League against Rheumatism. The host is the American Rheumatism Association in cooperation with the New York Rheumatism Association. The programme includes seven scientific sessions, five round-table conferences on various clinical topics, and short clinics, papers and reports at New York hospitals. The registration fee is \$10.00.

Obituary.

HERBERT SHINE FORREST.

We regret to announce the death of Dr. Herbert Shine Forrest, which occurred on January 29, 1949, at Melbourne.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Furnell, John Cecil, M.B., B.S., 1948 (Univ. Sydney), Western Suburbs Hospital, Liverpool Road, Croydon.

Wechsler, Zacharias, registered in accordance with the *Medical Practitioners Act*, Clause 17(b), 1938-45, c.o. Broughton Hall, Leichhardt.

Diary for the Month.

FEB. 22.—New South Wales Branch, B.M.A.: Ethics Committee.
FEB. 23.—Victorian Branch, B.M.A.: Council Meeting.
FEB. 24.—South Australian Branch, B.M.A.: Clinical Meeting.
FEB. 25.—Queensland Branch, B.M.A.: Council Meeting.
MARCH 1.—Federal Council of the B.M.A. in Australia: Melbourne.
MARCH 1.—New South Wales Branch, B.M.A.: Organization and Science Committee.
MARCH 2.—Western Australian Branch, B.M.A.: Council Meeting.
MARCH 2.—Victorian Branch, B.M.A.: Branch Meeting.
MARCH 3.—New South Wales Branch, B.M.A.: Special Groups Committee.
MARCH 3.—South Australian Branch, B.M.A.: Council Meeting.
MARCH 4.—Queensland Branch, B.M.A.: Branch Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; Phoenix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such notification is received within one month.

Subscription Rates.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rate is £3 per annum within Australia and the British Commonwealth of Nations, and £4 10s. per annum within America and foreign countries, payable in advance.